

**FINAL**

**AMENDMENT 3 TO THE CONSOLIDATED  
ATLANTIC HIGHLY MIGRATORY SPECIES  
FISHERY MANAGEMENT PLAN**



Including:

A Final Environmental Impact Statement,  
A Final Regulatory Impact Review,  
A Final Regulatory Flexibility Analysis,  
A Final Social Impact Analysis

2010

Department of Commerce  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
Office of Sustainable Fisheries  
Highly Migratory Species Management Division



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Atlantic Highly Migratory Species  
Fishery Management Plan

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## **Amendment 3 to the Consolidated Atlantic Highly Migratory Species Fishery Management Plan**

**Actions:** Implement management measures consistent with recent stock assessments for small coastal sharks (SCS) and shortfin mako sharks; establish a rebuilding plan for blacknose sharks; implement commercial quota limits consistent with stock assessment recommendations to end overfishing and rebuild overfished stocks; and, modify the Atlantic Highly Migratory Species (HMS) management unit to include smooth dogfish.

**Type of Statement:** Final Environmental Impact Statement; Final Regulatory Impact Review; Final Regulatory Flexibility Analysis; Final Social Impact Statement

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**Abstract:** The National Marine Fisheries Service (NMFS) is amending the 2006 Consolidated Atlantic HMS Fishery Management Plan (FMP) based on several stock assessments that were completed in 2007 and 2008. After considering comments received during scoping and on a Predraft document, NMFS released the Draft Environmental Impact Statement (DEIS) and proposed rule on July 24, 2009 (74 FR 36706 and 74 FR 36892). The DEIS and proposed rule considered measures to reduce fishing mortality and effort in order to rebuild overfished Atlantic shark species while ensuring that a limited shark fishery could be maintained. Additionally, NMFS proposed adding smooth dogfish under NMFS management due to growing concerns regarding the status of this unmanaged species. The Final Environmental Impact Statement (FEIS) describes a range of alternatives that could impact shark fishermen and dealers including modifying commercial quotas, modifying commercial gear restrictions, establishing a rebuilding plan for overfished stocks, establishing measures to prevent overfishing, modifying recreational measures, and establishing management measures for smooth dogfish.



## EXECUTIVE SUMMARY

Atlantic HMS are managed under the dual authority of the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (Magnuson-Stevens Act) and the Atlantic Tunas Convention Act (ATCA). Under the Magnuson-Stevens Act, National Marine Fisheries Service (NMFS) must manage fisheries to maintain optimum yield (OY) on a continuing basis while preventing overfishing. Under ATCA, NMFS is authorized to promulgate regulations, as may be necessary and appropriate, to implement the recommendations from the International Commission for the Conservation of Atlantic Tunas (ICCAT). The measures established in this amendment and associated rulemaking are taken under the authority of the Magnuson-Stevens Act. Currently, Atlantic sharks, tunas, swordfish, and billfish are managed under the 2006 Consolidated Atlantic HMS FMP, and its amendments.

Based on the 2007 SCS Stock Assessment, NMFS determined that blacknose sharks are overfished with overfishing occurring. As a result, NMFS announced its intent to prepare an Environmental Impact Statement (EIS) on May 7, 2008 (73 FR 25665). In this notice, NMFS asked for comments on existing commercial and recreational shark management measures that would assist the Agency in determining options for conservation and management of Atlantic sharks consistent with relevant federal statutes. On July 2 (73 FR 37932) and September 13 (73 FR 53407), NMFS announced the availability of a scoping document and five scoping meetings that would be held from July through September 2008. During the scoping meetings, NMFS described the results of recent stock assessments, issues that need to be addressed concerning shark management, and options or alternatives that may be implemented to achieve objectives. NMFS also consulted with the five Atlantic Fishery Management Councils (New England, Mid-Atlantic, South Atlantic, Gulf of Mexico, and the Caribbean), the two Atlantic interstate Marine Fisheries Commissions (Atlantic States and Gulf States), and the HMS Advisory Panel (AP). The scoping comment period ended on November 14, 2008. A summary of the comments received during scoping (May 7, 2008 to November 14, 2008) can be found on the HMS website: [http://www.nmfs.noaa.gov/sfa/hms/newslist/2009/02-12-09\\_Predraft\\_for\\_Amendment\\_3.pdf](http://www.nmfs.noaa.gov/sfa/hms/newslist/2009/02-12-09_Predraft_for_Amendment_3.pdf). A summary and the transcripts of the September 2008 AP meeting can also be found on the HMS website at <http://www.nmfs.noaa.gov/sfa/hms/>.

NMFS released a Predraft of Amendment 3 to the 2006 Consolidated HMS FMP and the summary of the scoping comments to the HMS AP in February 2009. NMFS requested that the HMS AP and consulting parties (New England, Mid-Atlantic, South Atlantic, Gulf, and Caribbean Fishery Management Councils, Marine Fisheries Commissions, U.S. Coast Guard, and other State and Federal Agency representatives) submit comments on the Predraft by March 16, 2009. While some of the options considered in the Predraft changed in the Draft Amendment 3 to the 2006 Consolidated HMS FMP (hereafter referred to as Amendment 3), the overall list of issues to be addressed did not change. A summary and the transcripts of the February 2009 AP meeting can be found on the HMS website at <http://www.nmfs.noaa.gov/sfa/hms/>.

On July 24, 2009 (74 FR 36706 and 74 FR 36892), the Draft Environmental Impact Statement (DEIS) and proposed rule were released, which considered a range of alternative management measures from several different topics including small coastal sharks (SCS)

commercial quotas, commercial gear restrictions, pelagic shark effort controls, recreational measures for SCS and pelagic sharks, and smooth dogfish management measures. The public comment period closed on September 25, 2009. NMFS held nine public hearings and consulted with all five Atlantic Fishery Management Councils and the Gulf and Atlantic States Marine Fisheries Commissions. A summary of public comments received, both spoken and written, and NMFS' response to those comments is included as Appendix D of this document and will also be in the final rule implementing the regulations. Copies of all the written comments received can be found at <http://www.regulations.gov> (search for 0648-AW65).

For National Environmental Policy Act (NEPA) purposes, NMFS considered a full range of alternatives and carried forward those considered to be reasonable for full consideration in the FEIS. Consistent with the regulations published by the Council on Environmental Quality (CEQ), 40 C.F.R. 1501-1508 (CEQ Regulations), NMFS has identified its preferred alternatives. The alternatives in this document considered the comments received from the public and consulting parties during the scoping, Predraft, and DEIS stages. Table 1 below provides the list of the changes in the FEIS from the DEIS. A summary of the issues addressed and other alternatives considered are also included. A full description and analysis of the different alternatives can be found in Chapters 2 and 4 of this document. NMFS has identified preferred alternatives within each of the lettered topics, and believes that the preferred alternatives in this document should, consistent with the Magnuson-Stevens Act and other domestic laws, rebuild overfished Atlantic shark stocks, end overfishing of Atlantic sharks, balance the needs of the fishermen and communities with the needs of the resource and scientists, and maximize sustainable fishing opportunities.

The Amendment also implements a mechanism for establishing Annual Catch Limits (ACLs) and Accountability Measures (AMs). On January 16, 2009, NMFS published NSG1 providing guidance for implementing the ACL and AM requirements of the Magnuson-Stevens Act (74 FR 3178). Per the January 2009 final rule, ACLs and AMs apply to all fisheries "unless otherwise provided for under an international agreement in which the United States participates." While, SCS, large coastal sharks (LCS), and pelagic sharks are predominately managed through domestic management measures, in recent years ICCAT has issued a number of recommendations regarding sharks (*e.g.*, ICCAT recommendations 2004-10, 2005-05, 2007-06, 2008-07, 2009-07 for bigeye thresher shark (*Alopias superciliosus*)). Nevertheless, ACLs and AMs will apply, as required, to all Atlantic shark species managed by NMFS.

The CEQ regulations direct Federal agencies to the full extent possible to integrate the requirements of NEPA with other planning and environmental review procedures required by law or by agency practice so that all procedures run concurrently rather than consecutively. To that end, this document integrates the FEIS required by NEPA, with the fisheries planning and management requirements associated with proposed amendment to a FMP under the Magnuson-Stevens Act, the Final Regulatory Flexibility Analysis (FRFA) required under the Regulatory Flexibility Act (RFA), 5 U.S.C. §§601-603; and the Regulatory Impact Review (RIR) prepared in accordance with Executive order 12866, "Regulatory Planning and Review."

**Table 1 The preferred alternatives at the draft and final stage of Amendment 3 to the Consolidated HMS FMP.**

<b>Commercial Measures</b>	<b>Preferred Alternatives in DEIS</b>	<b>Preferred Alternatives for FEIS</b>
SCS Commercial Quotas	<p>Alt. A4</p> <ul style="list-style-type: none"> <li>- <u>Small coastal sharks</u>: 56.9 mt</li> <li>- <u>Blacknose sharks</u>: 14.9 mt</li> <li>- No retention by incidental permit holders</li> <li>- Remove shark gillnet gear as authorized gear for sharks</li> </ul>	<p>Alt. A6</p> <ul style="list-style-type: none"> <li>- <u>Small Coastal Sharks</u>: 221.6 mt</li> <li>- <u>Blacknose sharks</u>: 19.9 mt</li> <li>- Retention by incidental permit holders allowed</li> <li>- Do not prohibit gillnets as authorized gear for sharks</li> </ul>
Commercial Gear Restrictions	Alt. B3 - Close the gillnet fishery to commercial shark fishing from South Carolina south, including the GOM and Caribbean Sea	Alt. B1 - No Action: Maintain current authorized gears for commercial shark fishing
Pelagic Shark Effort Controls	Alt. C5 - Take action at the international level to end overfishing of shortfin mako sharks	Alt. C5 - Same.
	Alt. C6 - Promote the release of shortfin mako sharks brought to fishing vessels alive	Alt. C6 - Same.
<b>Recreational Measures</b>	<b>Preferred Alternatives in DEIS</b>	<b>Preferred Alternatives in FEIS</b>
SCS Recreational Measures	Alt. D4 - Prohibit the retention of blacknose sharks in recreational fisheries	Alt. D1 - No Action: Maintain current recreational retention and size limits for blacknose sharks (54 inch size limit, 1 shark/person/vessel/trip)
Pelagic Sharks Recreational Measures	Alt. E3 - Take action at the international level to end overfishing of shortfin mako sharks	Alt. E3 - Same.
	Alt. E4 - Promote the release of shortfin mako sharks brought to fishing vessels alive	Alt E4 - Same.
<b>Other Species</b>	<b>Preferred Alternatives in DEIS</b>	<b>Preferred Alternatives in FEIS</b>
Smooth dogfish	<p>Alt F2 - Add smooth dogfish under NMFS Management and establish a federal permit requirement</p> <ul style="list-style-type: none"> <li>- Establish a smooth dogfish quota equal to the maximum annual landings from 1998-2007 plus one standard deviation (645.8 mt dw)</li> </ul>	<ul style="list-style-type: none"> <li>- Alt F2 and delay implementation until beginning of smooth dogfish fishing season in 2012 - provides time to work out details of permits and PRA requirements and for fishery to adjust to fins attached requirements.</li> <li>-Establish a smooth dogfish quota equal to the maximum annual landings from 1998-2007 plus two standard deviations (715.5 mt dw)</li> </ul>

## *SCS Commercial Quotas*

The 2007 stock assessment of SCS in the U.S. Atlantic and Gulf of Mexico consisted of assessments for blacknose sharks, finetooth sharks, bonnethead sharks, Atlantic sharpnose sharks, and the SCS complex. Results of the blacknose shark stock assessment determined that blacknose sharks are overfished ( $SSF_{2005} / SSF_{MSY} = 0.48$ ) and overfishing is occurring ( $F_{2005} / F_{MSY} = 3.77$ ). The assessment recommended a blacknose shark specific TAC and a corresponding rebuilding timeframe. Because a separate TAC was recommended for blacknose sharks, NMFS is creating a separate commercial quota for blacknose sharks in this amendment. One objective of this amendment is to establish a rebuilding plan for blacknose sharks by ensuring that fishing mortality levels for blacknose sharks are maintained at or below levels that would result in a 70 percent probability of rebuilding in the timeframe recommended by the assessment.

The 2007 blacknose shark stock assessment estimated that blacknose sharks would have a 70 percent probability of rebuilding by 2027 with a TAC of 19,200 individuals per year. To achieve this TAC, NMFS would need to reduce overall blacknose mortality by at least 78 percent across all fisheries that interact with blacknose sharks. With the exception of alternative A1, the No Action Alternative, NMFS considered several alternatives that would establish a separate blacknose shark quota, which would allow NMFS to better monitor the species, and a non-blacknose SCS quota, which would apply to finetooth, Atlantic sharpnose, and bonnethead sharks.

In the DEIS, alternatives A2 – A4 were based on the available SCS quota of 454 mt dw, the average blacknose shark landings of 61.5 mt dw from 2004 – 2007, and the need to reduce overall blacknose mortality in the shark fisheries by at least 78 percent. In the DEIS, NMFS preferred alternative A4, which would have set the non-blacknose SCS quota at 56.9 mt dw and the blacknose quota at 14.9 mt dw, which was the amount of blacknose sharks that would have been harvested while the non-blacknose SCS quota was harvested. The analyses indicated that the non-blacknose SCS quota would have been a 76 percent reduction from the average landings of non-blacknose SCS from 2004 through 2007. The blacknose quota of 14.9 mt dw would have been a 76 percent reduction from the average landings of blacknose sharks. Also, under alternative A4 in the DEIS, gillnet gear would have been prohibited and fishermen with incidental limited access permits (LAPs) would not have been authorized to retain blacknose sharks.

During the public comment period, NMFS received comments that indicated gillnet fishermen can target, or avoid catching, certain shark species; additional analyses of gillnet observer data determined that this may indeed be the case. Also, additional analyses of updated data during the DEIS comment period resulted in an increase in the blacknose average size, and a decrease in mortality rates, for blacknose sharks caught in gillnet gear. Using the same methodology, but using the updated data, the quotas considered in alternatives A2 – A4 have changed from those in the DEIS to the FEIS. In response to the findings from the update data and data analysis, NMFS has also considered a new alternative, alternative A6.

The revised alternatives A2 – A4, and the new alternative A6, would still establish a non-blacknose SCS quota for finetooth, Atlantic sharpnose, and bonnethead sharks. However, rather than subtracting the average blacknose shark landings from the SCS quota of 454 mt dw, as was done in the DEIS, the alternatives presented in the FEIS use a non-blacknose SCS quota of 221.6 mt dw, which is based on the average landings of those sharks from 2004 through 2008. This change in approach is due, in part, to be consistent with the 2007 SCS stock assessment that indicated that, while none of the three species of non-blacknose SCS are currently overfished, or undergoing overfishing, fishing mortality should not be increased.

The revisions made to alternatives A2 – A4 in the FEIS area as follows. Under alternative A2, the blacknose quota was based on the average landings of blacknose sharks of 55 mt dw from 2004 – 2008. With a 78 percent reduction, the blacknose quota would be set at 12.1 mt dw ( $55 * .78 = 55 - 42.9 = 12.1$ ). Alternative A3 would set a non-blacknose SCS quota of 110.8 mt dw, a 50 percent reduction of non-blacknose SCS landings from 2004 – 2008. The blacknose shark quota would be set at 19.9 mt dw, the amount of blacknose sharks that would be harvested while the non-blacknose SCS quota is harvested. Also, under alternative A3, fishermen with incidental permits would be allowed to retain blacknose sharks when the fishing season is open. Under alternative A4 gillnets would be prohibited as an authorized gear in the Atlantic shark fishery. A non-blacknose SCS quota of 55.4 mt dw would be established, which is based on the higher blacknose shark mortality rate from non-gillnet gears used in the SCS fishery since gillnets would be prohibited under this alternative. A separate blacknose-specific quota of 15.9 mt dw would be established, which is again the amount of blacknose sharks that would be landed while the non-blacknose SCS quota was harvested. Under alternative A4, fishermen with an incidental LAP would not be authorized to retain any blacknose sharks.

The preferred alternative, alternative A6, is a new alternative that followed logically from updated data from the NMFS SEFSC, and comments received during the DEIS public comment period, which resulted in a re-evaluation of the proposed changes to the SCS fishery to rebuild blacknose sharks. NMFS believes that this new preferred alternative better reflects the intent of the previous preferred alternative, and remains a reasonable alternative capable of meeting the purpose and need of the action. It does not alter in any material manner management approaches fully analyzed in the DEIS. Alternative A6 would establish a new non-blacknose SCS quota of 212.6 mt dw, which would be equal to the average annual landings for the non-blacknose SCS fishery from 2004 through 2008, and an individual blacknose shark quota of 19.9 mt dw (43,872 lb dw), which would be a 64 percent reduction in blacknose shark landings relative to average landings from 2004 – 2008 of 55 mt dw. Under alternative A6, all currently authorized gears for shark fishing would be allowed in the fishery, regardless of geographic region and incidentally permitted fishermen would not be prohibited from retaining blacknose sharks. In addition, alternative A6 would implement a framework mechanism that would give NMFS the flexibility to increase or decrease either the blacknose or non-blacknose SCS quotas based on the ability of fishermen to avoid blacknose sharks and target non-blacknose SCS, and any subsequent change in status based on new stock assessments of these species of sharks.

Alternative A6 would result in long-term significantly beneficial ecological impacts to blacknose sharks by reducing mortality of this species below the commercial allowance of 7,094 blacknose sharks per year that is necessary for this stock to rebuild with a 70 percent probability by 2027 consistent with the rebuilding plan and the objectives of this amendment. Alternative

A6 maintains fishing effort and mortality in the non-blacknose SCS fishery to a level that is equal to the average landings for these species for the years 2004 through 2008. NMFS recognizes that there may be adverse social and economic impacts on the fishing community due to the reduced blacknose shark quota, however, in selecting the quota of 221.6 mt dw for the non-blacknose SCS fishery, NMFS is hoping to minimize those adverse socioeconomic impacts, since the bulk of the catch in the SCS fishery comes from the non-blacknose SCS species (i.e. finetooth, sharpnose, and bonnethead sharks) that have been determined to not be overfished or undergoing overfishing. This alternative was selected because it strikes a balance between meeting the rebuilding requirements of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) by addressing the overfished status and overfishing of blacknose sharks while minimizing the socio-economic impacts to shark fishery participants.

### *Commercial Gear Restrictions*

Because gillnets are the predominate gear used to harvest blacknose and other SCS species, NMFS considered a range of commercial gear alternatives from no action (maintain all currently authorized gears in the fishery) to prohibiting gillnet gear in all areas of the Atlantic including the Gulf of Mexico and the Caribbean Sea. In the DEIS the preferred alternative, alternative B3, would have closed the shark gillnet fishery to commercial shark fishing from South Carolina south, including the Gulf of Mexico and the Caribbean Sea. This alternative would have mitigated impacts to the smooth dogfish fishery participants who typically use gillnets from North Carolina north.

Current analysis of gillnet observer data indicates that gillnet fishermen are likely able to target certain species while avoiding others and that the mortality rate for blacknose sharks caught in gillnets was lower than previously believed. Therefore, NMFS has changed the preferred alternative from the DEIS to the FEIS to alternative B1, the No Action alternative, which would maintain all currently authorized gear types for the Atlantic shark fisheries. Since there would be no change to the gear restrictions under alternative B1, the ecological impacts associated with this alternative would be neutral. Because blacknose sharks can be rebuilt while continuing to allow gillnet gear, NMFS believes that more data are necessary to determine the extent to which gillnet fishermen can avoid certain species before eliminating the gear from the fishery. In addition, Alternatives B2 and B3 could have adverse ecological impacts for blacknose shark stocks compared to the preferred alternative, as discards of blacknose sharks would be higher if gillnets were prohibited, and many of the discards could be juveniles. Under alternatives B2 and B3, adverse social and economic impacts on the SCS commercial shark participants would likely be disproportionate to the ecological benefits to blacknose sharks under these two alternatives. If implemented, alternative B1, the No Action alternative, when combined with alternative A6 (the preferred alternative) would reduce blacknose shark mortality to levels consistent with the rebuilding plan for this species. NMFS further believes that allowing gillnet gear as an authorized gear for sharks is consistent with the 2008 Biological Opinion for the Atlantic shark fishery, which determined that the Atlantic shark fishery is not likely to jeopardize the continued existence of endangered green, leatherback, and Kemp's ridley sea turtles; the endangered smalltooth sawfish; or the threatened loggerhead sea turtle.

### *Pelagic Shark Commercial and Recreational Measures*

In 2008, an updated stock assessment for shortfin mako sharks was conducted by the International Commission for the Conservation of Atlantic Tunas's (ICCAT) Standing Committee for Research and Statistics (SCRS). Based on the results of this stock assessment, NMFS determined that the North Atlantic shortfin mako sharks are not overfished but are approaching an overfished condition and are experiencing overfishing. The 2008 ICCAT stock assessment did not recommend a TAC or mortality reduction to prevent overfishing of shortfin mako sharks, making it difficult to set a quota or other limit to prevent overfishing. Since shortfin mako sharks have not been determined to be overfished, NMFS is not implementing a rebuilding plan for this species at this time. NMFS considered several alternatives for the commercial and recreational fisheries to end overfishing that could have a variety of impacts from no impact (No Action alternative) to significant impacts (e.g., placement of this species on the prohibited species list).

The preferred alternatives, C5 and C6, and E3 and E4, in the commercial and recreational fisheries, respectively, would take action at the international level through international fishery management organizations to establish management measures to end overfishing of shortfin mako sharks, and to promote the live release of shortfin mako sharks in the domestic commercial and recreational shark fisheries. The preferred alternatives would not change the current commercial and recreational regulations for shortfin mako sharks. In comparison to the cumulative fishing mortality of North Atlantic shortfin mako sharks caused by other nations, the United States contributes very little to shortfin mako shark mortality in the North Atlantic because there is no directed U.S. commercial fishery, and a limited recreational fishery. U.S. commercial harvest of Atlantic shortfin mako sharks has historically been approximately 9 percent of the recorded total international landings, based on 1997 through 2008 data. Because of the small U.S. contribution to North Atlantic shortfin mako shark mortality, domestic reductions of shortfin mako shark mortality alone would not end overfishing of the entire North Atlantic stock. Therefore, NMFS believes that ending overfishing and preventing an overfished status would be better accomplished through international efforts where other countries that have larger takes of shortfin mako sharks could also participate in shortfin mako shark mortality reductions. While this alternative could have short-term minor, adverse ecological impacts and neutral socioeconomic impacts for the portion of the shortfin mako shark stock that is fished by U.S. fishermen, any international management recommendations adopted by the United States to help protect shortfin mako sharks would be implemented domestically and could have beneficial ecological impacts on shortfin mako sharks and potentially negative socioeconomic impacts on U.S. fishermen in the long term. Promoting the release of shortfin mako sharks that are brought to the vessel alive could result in a reduction in shortfin mako shark mortality and thus, have long-term beneficial ecological impacts for this species. NMFS did not change the preferred alternatives from the DEIS to the FEIS stage.

### *SCS Recreational Measures*

NMFS considered several alternative in the DEIS to reduce mortality of blacknose sharks in the recreational fishery from the No Action alternative, to prohibiting this species in the recreational fishery. Under the preferred alternative D1, the No Action alternative, NMFS would maintain the existing recreational size and retention limits for SCS. Alternative D1 is the

preferred alternative because blacknose sharks rarely reach a size greater than the current federal minimum size; therefore, the 54 inch FL size limit creates a *de facto* retention prohibition of blacknose sharks in federal waters. Recreational anglers are currently allowed one authorized shark greater than 54 inches (4.5 ft) FL per vessel per trip (including SCS). In addition, they are allowed one bonnethead shark and one Atlantic sharpnose shark per person per trip. The current recreational harvest of SCS combined from 2004-2007 was 536,886 fish (approximately 33,555 per year). The Atlantic sharpnose shark was the most abundant species caught at a rate of approximately 86,863 per year. The other average yearly harvest rates were approximately 35,165 for bonnethead sharks, 10,360 for blacknose sharks, and 1,834 for finetooth sharks. Because there would be no change to the current retention limits under alternative D1, there would be direct and indirect, neutral ecological impacts in the short- and long-term associated with this alternative for blacknose sharks. This includes neutral ecological impacts for Atlantic sharpnose, bonnethead, and finetooth sharks, as these species are currently not overfished and overfishing is not occurring. The selected alternative would also have neutral socioeconomic impacts on fishery participants as the current recreational regulations would remain unchanged.

In the DEIS, the preferred alternative was alternative D4, which would have prohibited blacknose sharks in the recreational fishery. However, after evaluating public comments from the DEIS, and because the 54 inch size limit in place under the No Action alternative affords adequate protection for blacknose sharks, thereby contributing to the rebuilding of the species, NMFS chose to prefer alternative D1 in the FEIS rather than the previously preferred alternative, alternative D4. Recreational landings of blacknose sharks often occur in state waters where the regulations for recreational catch are sometimes less strict than regulations in federal waters. Therefore, complementary size limits of 54 inches FL in state waters, which would effectively prohibit the retention of blacknose sharks, would be important in achieving the mortality reduction required to attain the TAC recommended by the 2007 SCS Stock Assessment. If overfishing continues to occur on the blacknose shark stock based on the next assessment, NMFS would ask states to implement measures consistent with federal regulations to help reduce mortality and meet rebuilding targets for blacknose sharks and, depending on the TAC provided in the stock assessment, may again consider prohibiting recreational retention of blacknose sharks.

### *Smooth Dogfish*

NMFS currently manages sharks in four management units (small coastal sharks, pelagic sharks, large coastal sharks, and prohibited species). There are additional species of sharks that are HMS and that fall outside of the current management units. The management of these species remain under Secretarial authority should the Secretary determine the species is in need of conservation and management. One of these species, smooth dogfish, is not currently managed at the federal level. Although smooth dogfish were previously included in a fishery management unit (FMU) that included deepwater and other sharks in order to prevent finning, these species were removed from the FMU in the 2003 Amendment 1 to the Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks since they were protected from finning under the Shark Finning Prohibition Act (67 FR 6124, February 11, 2002). The Magnuson-Stevens Act is the primary statute giving fishery management authority to NMFS, on behalf of the Secretary of Commerce. The Magnuson-Stevens Act also provides authority for the Regional Fishery Management Councils to manage stocks and species within each Council's

geographic jurisdiction due to the Council's close cooperation with constituents, fishery experience and knowledge, and consensus building process. One exception to this management authority is for Atlantic HMS, which are managed solely under NMFS, on behalf of the Secretary of Commerce. As detailed below, NMFS has determined that smooth dogfish falls within the congressional directive regarding HMS and should be managed under the Secretary's authority. NMFS has also determined that smooth dogfish are in need of conservation and management under NMFS authority. However, limited data regarding landings, effort, or participants in the fishery complicates new regulations.

The preferred alternative, alternative F2, would implement federal management of smooth dogfish and establish a permit requirement for commercial and recreational retention of smooth dogfish in federal waters. Management measures, including the federal permit requirement and the quota, would not be implemented until the 2012 fishing season to allow NMFS time to perform outreach and education regarding the fins attached requirement and to allow time for implementation of the new federal permit. A federal permit requirement would allow NMFS to collect data regarding participants in the fishery. Placing smooth dogfish under NMFS management would require that fishermen fishing for smooth dogfish comply with current Atlantic HMS regulations in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea, including the requirement that sharks be offloaded with their fins naturally attached. Requiring that fins remain naturally attached is a major change from how the fishery currently operates but is one that NMFS feels is necessary for species identification, enforcement and consistency with other Atlantic shark regulations. This alternative would also provide NMFS the ability to select smooth dogfish vessels to carry an observer. This alternative would not require fishermen to attend the protected species release, disentanglement, and identification workshops. As NMFS gathers information about the fishery and the fishermen, NMFS may decide to require that smooth dogfish fishermen attend these workshops as is required in other HMS longline and gillnet fisheries. Over time, NMFS would likely implement logbook or other reporting requirements for smooth dogfish fishermen. NMFS would not do this, however, until the universe of fishermen is known and until NMFS can determine the appropriate mechanism of reporting without duplicating current reporting requirements. Dealers would be required to report smooth dogfish on HMS dealer reports or through the Standard Atlantic Fisheries Information System (SAFIS). The commercial permit would be an open access permit and recreational fishermen would need to obtain either an HMS Angling or Charter/Headboat permit.

Consistent with the Magnuson-Stevens Act, NMFS must implement an ACL for the smooth dogfish fishery. The landings component of the sector-ACL, or commercial quota, would be based on historic landings data spanning 1998-2007 (the last 10 years with complete landings data). The preferred quota alternative, alternative F2a4, would establish a smooth dogfish quota equal to the maximum annual landings from 1998-2007 plus two standard deviations (1,577,319 lb dw). The preferred quota alternative would allow the fishery to continue to operate even if sources of dogfish mortality that were previously unknown start to be reported. In the DEIS, NMFS preferred alternative F2a3 that would have set the quota equal to the maximum annual landings from 1998-2007 plus one standard deviation (1,423,727 lb dw). During the DEIS public comment period, multiple commenters stated that the proposed smooth dogfish quota was too low, and the SEFSC offered that two standard deviations, rather than one, above the maximum annual landings would better account for underreporting. Since the fishery

has not been previously managed, there have been no reporting requirements in the past. While the data from ACCSP used in this analysis likely included the vast majority of landings, the possibility exists of remaining unreported landings. Therefore, NMFS changed the preferred alternative from alternative F2a3 in the DEIS to alternative F2a4 in the FEIS. NMFS believes that this new preferred alternative reflects the intent of the previous preferred alternative, and remains within the range of considered alternatives. As stated in the purpose and need, the smooth dogfish management measures are designed to collect data while minimizing alterations to the fishery. To achieve this goal, it is important to ensure that the smooth dogfish quota is set at a level that allows current fishing practices to continue, to the extent practicable. Within the quota established under this preferred alternative, a set-aside quota was considered for activities that collect dogfish for research or for public display. The current set-aside for all shark species under NMFS' jurisdiction is 60 mt ww. The preferred set-aside quota would establish a separate smooth dogfish set-aside quota for the exempted fishing program.

The preferred alternative F2 would likely have short-term, direct, minor, beneficial ecological impacts on smooth dogfish if the requirement of a federal permit and/or the requirement to keep fins attached reduces the number of participants in the fishery. In the long-term, the ecological impacts could also be direct, minor and beneficial if fishing effort does not increase and landings data are collected to better characterize the fishery and the stock. If the fishery moves fishermen exclusively into state waters as a result of these measures, there is a potential for a variety of adverse or beneficial ecological impacts depending on the life history of the species and its migratory pattern. Requiring that fins remain naturally attached through offloading would have adverse socioeconomic impacts as fishermen and dealers adjust to this new requirement. However, in the long term, NMFS believes that the methods and techniques employed in other shark fisheries can be adopted in smooth dogfish fishery. The delay in implementation until 2012 should provide fishermen and dealers the opportunity to adjust their operations in order to comply with this requirement. The fees associated with the permit would be minimal, and are not expected to create any impediment to entering or remaining in the fishery.

NMFS is currently engaged in formal Section 7 consultation in accordance with the ESA, paragraph 7(a)(2), to determine the potential level of incremental effect that may arise as a result of the preferred management measures for smooth dogfish in the FEIS. NMFS has not yet issued a final BiOp for the smooth dogfish fishery. NMFS will review that BiOp once it is issued and supplement the analysis in this FEIS if the consultation reveals any new or significant effects with respect to the interaction between gillnet fishing for smooth dogfish and protected species that were not considered in the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP. This FEIS incorporates by reference the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP. A detailed discussion of the effects of such management relevant to the shark fishery is included in that document. NMFS does not anticipate any substantial change in impact to protected species since the measures proposed for smooth dogfish management are largely administrative, and thus unlikely to affect the manner and extent of fishing for smooth dogfish or redistribution of effort into other fisheries. NMFS assumes there is a correlation between fishing effort and protected species interactions. Since smooth dogfish management measures would establish a quota and permit requirement, fishing effort for smooth dogfish would be capped or slightly reduced with a corresponding diminishment of the possibility of

increased protected resource interactions. In addition, increased observer in the smooth dogfish fishery as a result of a federal permit requirement would better characterize protected resources interactions with the smooth dogfish fishery.

Under the preferred alternative (F2), the implementation of the management measures would be delayed until the beginning of the smooth dogfish fishing season in 2012 to allow time to consider and evaluate the information and requirements included in the final BiOp. If the assessment of effects in the BiOp provides new and meaningful information not considered in this FEIS, NMFS will supplement the FEIS, as appropriate, before implementing any management measures proposed in alternative F2. In the interim, NMFS will not impose any management authority or related conservation and management measures on the smooth dogfish fishery, and thus will not cause any effect on protected species related to such management. In other words, preferred alternative F2 would maintain the status quo with respect to the smooth dogfish fishery as it relates to protected species prior to receiving a final BiOp. While NMFS would finalize the rulemaking with measures for blacknose shark and shortfin mako sharks becoming effective 30 days after publication of the final rule in the Federal Register, the measures, if any, selected for management of smooth dogfish would be deferred to allow NMFS, in consultation with SERO PRD, to develop reasonable and prudent alternatives (RPAs) that could be implemented while avoiding adverse impacts to listed species, as necessary.



**MASTER TABLE OF CONTENTS**

**Executive Summary** ..... **iii**

**Master Table of Contents**..... **xv**

**Master List of Tables**..... **xxi**

**Master List of Figures** ..... **xxvii**

**List of Commonly Used Abbreviations and Acronyms**..... **xxix**

**1.0 Introduction**..... **1-1**

    1.1 Brief History of This Amendment ..... 1-1

    1.2 Brief Management History ..... 1-4

    1.3 Rebuilding and Preventing Overfishing of Atlantic Sharks ..... 1-6

        1.3.1 The Mechanism for Establishing ACLs and AMs ..... 1-6

        1.3.2 Stock Status and Status Determination Criteria ..... 1-9

        1.3.3 National Standard 1 and Determining the Rebuilding Timeframe ..... 1-11

        1.3.4 2007 Stock Assessment and Rebuilding Timeframe for Blacknose Sharks ..... 1-13

        1.3.5 Smooth Dogfish ..... 1-14

        1.3.6 2008 Stock Assessment for Shortfin Mako Sharks ..... 1-16

    1.4 Purpose and Need ..... 1-17

        1.4.1 Need ..... 1-17

        1.4.2 Purpose and Objectives ..... 1-18

    1.5 Other Considerations ..... 1-19

**2.0 Summary of the Alternatives** ..... **2-1**

    2.1 Commercial Measures ..... 2-3

        2.1.1 SCS Commercial Quotas ..... 2-3

        2.1.2 Commercial Gear Restrictions ..... 2-8

        2.1.3 Pelagic Shark Effort Controls ..... 2-9

    2.2 Recreational Measures ..... 2-11

        2.2.1 Small Coastal Sharks ..... 2-11

        2.2.2 Pelagic Sharks ..... 2-13

    2.3 Smooth Dogfish ..... 2-15

    2.4 Alternatives Considered But Not Further Analyzed ..... 2-21

**3.0 Description of Affected Environment** ..... **3-1**

    3.1 Introduction to Highly Migratory Species Management and Highly Migratory Species Fisheries ..... 3-1

        3.1.1 History of Domestic Shark Management ..... 3-2

        3.1.2 International Shark Management ..... 3-5

        3.1.3 Existing State Regulations ..... 3-5

    3.2 Status of the Stocks ..... 3-13

        3.2.1 Atlantic Sharks ..... 3-14

    3.3 Habitat Types and Distributions ..... 3-21

    3.4 Fishery Data Update ..... 3-21

        3.4.1 Bottom Longline ..... 3-22

        3.4.2 Gillnet Fishery ..... 3-35

        3.4.3 Pelagic Longline Fishery ..... 3-45

        3.4.4 Recreational Handgear ..... 3-57

        3.4.5 Fishery Data: Landings by Shark Species ..... 3-61

3.5	HMS Permits and Tournaments.....	3-67
3.5.1	Upgrading and Safety Issues.....	3-70
3.5.2	HMS CHB Permits.....	3-70
3.5.3	HMS Angling Permits.....	3-71
3.5.4	Dealer Permits.....	3-72
3.5.5	Exempted Fishing Permits (EFPs), Display Permits, Chartering Permits, and Scientific Research Permits (SRPs).....	3-74
3.5.6	Atlantic HMS Tournaments.....	3-76
3.6	Economic Status of HMS Shark Fisheries.....	3-80
3.6.1	Commercial Fisheries.....	3-81
3.6.2	Recreational Fisheries.....	3-85
3.7	Community and Social Update.....	3-88
3.7.1	Overview of Current Information and Rationale.....	3-89
3.7.2	Methodology.....	3-90
3.7.3	Summary of Social Data and Information.....	3-92
3.8	International Trade and Fish Processing.....	3-92
3.8.1	Overview of International Trade for Atlantic HMS.....	3-92
3.8.2	U.S. Exports of HMS.....	3-93
3.8.3	U.S. Imports of Atlantic HMS.....	3-94
3.9	Bycatch, Incidental Catch, and Protected Species.....	3-95
3.9.1	Bycatch Reduction and the Magnuson-Stevens Act.....	3-96
3.9.2	Standardized Reporting of Bycatch.....	3-97
3.9.3	Bycatch Reduction in HMS Fisheries.....	3-104
3.10	Evaluation and Monitoring of Bycatch.....	3-104
3.10.1	Bycatch Mortality.....	3-105
3.10.2	HMS Fishing Gears with Protected Species.....	3-107
3.10.3	Measures to Address Protected Species Concerns.....	3-115
3.10.4	Bycatch of HMS in Other Fisheries.....	3-116
3.10.5	Evaluation of Other Bycatch Reduction Measures.....	3-118
3.11	Effectiveness of Existing Time/Area Closures in Reducing Bycatch.....	3-119
<b>4.0</b>	<b>Environmental Consequences of Alternatives.....</b>	<b>4-1</b>
4.1	Commercial Measures.....	4-4
4.1.1	SCS Commercial Quotas.....	4-4
4.1.2	Commercial Gear Restrictions.....	4-21
4.1.3	Pelagic Shark Effort Controls.....	4-26
4.2	Recreational Measures.....	4-41
4.2.1	Small Coastal Sharks.....	4-41
4.2.2	Pelagic Sharks.....	4-45
4.3	Smooth Dogfish.....	4-52
4.4	Impacts on Essential Fish Habitat.....	4-71
4.5	Impacts on Protected Resources.....	4-71
4.6	Environmental Justice.....	4-77
4.7	Coastal Zone Management Act.....	4-79
4.8	Cumulative Impacts.....	4-83
4.9	Past, Present, and Reasonably Foreseeable Actions.....	4-89
4.10	Cumulative Ecological Impacts.....	4-100

4.11	Cumulative Social and Economic Impacts .....	4-102
<b>5.0</b>	<b>Mitigation and Unavoidable Impacts.....</b>	<b>5-1</b>
5.1	Mitigation Measures .....	5-1
5.2	Unavoidable Adverse Impacts .....	5-3
5.2.1	Unavoidable Adverse Socioeconomic Impacts .....	5-3
5.2.2	Unavoidable Adverse Ecological Impacts .....	5-4
5.3	Irreversible and Irretrievable Commitment of Resources.....	5-4
<b>6.0</b>	<b>Economic Evaluation .....</b>	<b>6-1</b>
6.1	Number of Vessel and Dealer Permit Holders.....	6-1
6.2	Gross Revenue of the Commercial Shark Fishermen .....	6-2
6.3	Variable Costs and Net Revenues of Commercial Shark Fishermen .....	6-4
6.4	Expected Economic Impacts of the Alternatives .....	6-5
6.4.1	Commercial Measures .....	6-5
6.4.2	Recreational Measures .....	6-29
6.4.3	Smooth Dogfish .....	6-31
<b>7.0</b>	<b>Regulatory Impact Review.....</b>	<b>7-1</b>
7.1	Description of the Management Objectives.....	7-1
7.2	Description of the Fishery.....	7-2
7.3	Statement of the Problem.....	7-2
7.4	Description of Each Alternative.....	7-2
7.5	Economic Analysis of Expected Effects of Each Alternative Relative to the Baseline.....	7-3
7.6	Conclusions.....	7-15
<b>8.0</b>	<b>Final Regulatory Flexibility Analysis.....</b>	<b>8-1</b>
8.1	Statement of the Need for and Objectives of this Final Rule .....	8-1
8.2	A Summary of the Significant Issues Raised By the Public Comments in Response to the Initial Regulatory Flexibility Analysis, a Summary of the Assessment of the Agency of Such Issues, and a Statement of Any Changes Made in the Rule as a Result of Such Comments .....	8-1
8.3	Description and Estimate of the Number of Small Entities to Which the Final Rule Would Apply.....	8-4
8.4	Description of the Projected Reporting, Record-keeping, and Other Compliance Requirements of the Proposed Rule, Including an Estimate of the Classes of Small Entities Which Would Be Subject to the Requirements of the Report or Record .....	8-6
8.5	Description of the Steps the Agency Has Taken to Minimize the Significant Economic Impact on Small Entities Consistent with the Stated Objectives of Applicable Statutes, Including a Statement of the Factual, Policy, and Legal Reasons for Selecting the Alternative Adopted in the Final Rule and the Reason That Each one of the Other Significant Alternatives to the Rule Considered by the Agency Which Affect Small Entities Was Rejected .....	8-6
8.5.1	Commercial Measures .....	8-8
8.5.2	Recreational Measures .....	8-20
8.5.3	Smooth Dogfish .....	8-22
<b>9.0</b>	<b>Community Profiles.....</b>	<b>9-1</b>
9.1	Introduction.....	9-1
9.2	Methodology.....	9-2
9.2.1	Previous community profiles and assessments.....	9-2

9.3	Overview of the Shark Fishery .....	9-3
9.4	Summary of Fisheries Impacts.....	9-5
<b>10.0</b>	<b>Other Considerations.....</b>	<b>10-1</b>
10.1	National Standards.....	10-1
10.2	Consideration of Magnuson-Stevens Section 304(g) Measures .....	10-7
<b>11.0</b>	<b>Life History Accounts and Essential Fish Habitat Descriptions .....</b>	<b>11-1</b>
11.1	Habitat.....	11-1
11.2	Shark .....	11-2
11.2.1	Smooth Dogfish .....	11-2
11.2.2	Methodology for Determining Smooth Dogfish EFH .....	11-3
<b>12.0</b>	<b>List of Preparers .....</b>	<b>12-1</b>
12.1	List of Agencies, Organizations, and Persons Consulted and to Whom Copies of the EIS Will Be Sent.....	12-1
<b>A.0</b>	<b>Appendix: Quotas and Retention Limit Calculations.....</b>	<b>A-1</b>
A.1	Background.....	A-1
A.2	Alternative A2.....	A-5
A.3	Alternatives A3 and A4.....	A-10
A.4	Alternative A6.....	A-17
<b>B.0</b>	<b>Appendix B.....</b>	<b>B-1</b>
B.1	Southern Shrimp Alliance’s Scoping Comments Entitled “Elements of Blacknose Shark Assessment that Warrant Reconsideration”.....	B-1
B.2	Office of Sustainable Fisheries’ Request for SEFSC Assistance with Response to Southern Shrimp Alliance’s Comments Entitled “Elements of Blacknose Shark Assessment that Warrant Reconsideration” .....	B-9
B.3	SEFSC’s Response to Office of Sustainable Fisheries’ Request for SEFSC Assistance with Response to Southern Shrimp Alliance’s Comments and Additional Blacknose Shark Analyses.....	B-11
B.4	SEFSC’s Response to Southern Shrimp Alliance’s Comments Entitled “Elements of Blacknose Shark Assessment that Warrant Reconsideration” .....	B-13
B.5	Results of Sensitivity Analyses for Reduction in Blacknose Bycatch in Shrimp Trawls.....	B-23
<b>C.0</b>	<b>Appendix C.....</b>	<b>C-1</b>
C.1	Mid-Atlantic Fishery Management Council’s Request to Secretary Locke to Manage Smooth Dogfish.....	C-1
C.2	National Marine Fisheries Service’s Initial Response to the Mid-Atlantic Fishery Management Council’s Request.....	C-5
C.3	National Marine Fisheries Service’s Final Determination for Management of Smooth Dogfish.....	C-7
<b>D.0</b>	<b>Appendix: Proposed Rule and Draft Environmental Impact Statement Comments and Responses.....</b>	<b>D-1</b>
D.1	SCS Commercial Quotas.....	D-1
D.2	Commercial Gear Restrictions.....	D-14
D.3	Commercial Pelagic Shark Effort Controls.....	D-18
D.4	Recreational Measures for SCS.....	D-22
D.5	Recreational Measures for Pelagic Sharks.....	D-24
D.6	Smooth Dogfish.....	D-28

D.7	General Comments.....	D-45
D.8	Economic Comments.....	D-51
<b>E.0</b>	<b>Appendix E.....</b>	<b>E-1</b>
E.1	Letter to Thomas McIlwain, Chairman of the Gulf of Mexico Fishery Management Council Dated July 22, 2008.....	E-1
E.2	Letter to Rick Leard, Acting Executive Director of the Gulf of Mexico Fishery Management Council Dated July 22, 2008.....	E-5
E.3	Letter to Robert Shipp, Chairman of the Gulf of Mexico Fishery Management Council Dated October 14, 2009.....	E-9
E.4	Letter to Thomas McIlwain, Chairman of the Gulf of Mexico Fishery Management Council Dated July 24, 2009.....	E-11
E.5	Letter to Steve Bortone, Executive Director of the Gulf of Mexico Fishery Management Council Dated October 14, 200.....	E-15
E.6	Letter to Rick Leard, Deputy Executive Director of the Gulf of Mexico Fishery Management Council Dated July 24, 2009.....	E-17
E.7	Letter to George J. Geiger, Chairman of the South Atlantic Fishery Management Council Dated July 22, 2008.....	E-21
E.8	Letter to Bob Mahood, Executive Director of the South Atlantic Fishery Management Council Dated July 22, 2008.....	E-25
E.9	Letter to Charles Duane Harris, Chairman of the South Atlantic Fishery Management Council Dated September 4, 2009.....	E-29
E.10	Letter to Charles Duane Harris, Chairman of the South Atlantic Fishery Management Council Dated July 24, 2009.....	E-30
E.11	Letter to Bob Mahood, Executive Director of the South Atlantic Fishery Management Council Dated September 4, 2009.....	E-33
E.12	Letter to Bob Mahood, Executive Director of the South Atlantic Fishery Management Council Dated July 24, 2009.....	E-34



## MASTER LIST OF TABLES

Table 1	The preferred alternatives at the draft and final stage of Amendment 3 to the Consolidated HMS FMP.....	v
Table 2.1	An overview of all the alternatives considered in draft Amendment 3 to the 2006 Consolidated HMS FMP.....	2-1
Table 2.2	Framework showing potential for quota changes for blacknose and non-blacknose SCS if fishermen are able to target specific species of sharks.....	2-7
Table 2.3	Framework showing potential for quota changes for blacknose and non-blacknose sharks if fishermen are not able to target specific species of sharks. ....	2-7
Table 2.4	Total Annual Landings by Year and Summary Data spanning 1998-2007.....	2-19
Table 3.1	State Rules and Regulations Pertaining to Sharks, as of January 1, 2010.....	3-8
Table 3.2	Common names of shark species included within the four species management units under Amendment 2 to the Consolidated HMS FMP.....	3-16
Table 3.3	Summary Table of Biomass and Fishing Mortality for Small Coastal Sharks (SCS) and Shortfin Mako Sharks.....	3-19
Table 3.4	Species composition of observed BLL catch during 2008 for BLL trips targeting sharks in the South Atlantic.....	3-29
Table 3.5	Species composition of observed BLL catch during 2008 for BLL trips targeting sharks in the Gulf of Mexico.....	3-30
Table 3.6	Total Number of Observed Sea Turtle Interactions by Species by Month for Years 1994-2008 in the Shark BLL Fishery.....	3-32
Table 3.7	Total number of Observed Sea Turtle Interactions by Year for Years 1994-2008 in the Shark BLL Fishery.....	3-32
Table 3.8	Total Strike Gillnet Shark Catch and Bycatch by Species in order of Decreasing Abundance for all Observed Trips, 2005-2006.....	3-40
Table 3.9	Total Shark Catch and bycatch by Species and Species Disposition in Order of Decreasing Abundance for all Observed Drift gillnet Sets 2008.....	3-41
Table 3.10	Total Sink gillnet Shark Catch and Bycatch by Species in order of Decreasing Abundance for all Observed Trips, 2008.....	3-42
Table 3.11	Total number of Observed Sea Turtle Interactions by Year from 2000-2008 in the Shark Gillnet Fishery.....	3-44
Table 3.12	Observed Interactions of Sea Turtles in the PLL Fishery and Directed Shark BLL and Gillnet Fishery by Year and Gear Type (LGH = Loggerhead, LTRB = Leatherback).....	3-44
Table 3.13	Average Number of Hooks per PLL Set, 1999-2008.....	3-46
Table 3.14	Observer Coverage of the PLL Fishery.....	3-48
Table 3.15	Reported Catch of Species Caught by U.S. Atlantic PLLs, in Number of Fish, for 2001-2008.....	3-49
Table 3.16	ICCAT Bycatch Table (LL, longline; GILL, gillnets; PS, purse-seine; BB, baitboat; HARP, harpoon; TRAP, traps).....	3-53
Table 3.17	Estimated International Landings of Pelagic Sharks for All Countries in the Atlantic: 2000-2008 (mt ww) <sup>1</sup> .....	3-56
Table 3.18	Estimates of Total Recreational Harvest of Atlantic Sharks: 1999-2008 (numbers of fish in thousands).....	3-59
Table 3.19	Recreational Harvest of Selected Atlantic Sharks by Species, in number of fish: 1999-2008.....	3-59

Table 3.20	Observed or reported number of Atlantic Sharks kept in the rod and reel fishery, Maine through Virginia, 2000 -2008. ....	3-60
Table 3.21	Observed or reported number of Atlantic Sharks released in the rod and reel fishery, Maine through Virginia, 2000 -2008. ....	3-61
Table 3.22	Commercial landings of small coastal sharks in lb dw: 1999-2008. ....	3-62
Table 3.23	Commercial landings of pelagic sharks in lb dw: 1999-2008.....	3-63
Table 3.24	The number of sharks and non-shark species that were discarded alive, discarded dead, and kept under the exempted fishing program during 2008, including exempted fishing permits, display permits, scientific research permits, and letters of acknowledgement. ....	3-64
Table 3.25	Catch history for the Small Coastal Shark complex (numbers of fish). ....	3-65
Table 3.26	Distribution of active Shark Directed and Incidental Permits and Other Permits Held by Shark Fishermen in Other Fisheries. Summarized by State as of November 5, 2009.....	3-68
Table 3.27	Atlantic HMS CHB Permits by State (Principle State on Registration) in 2009.....	3-71
Table 3.28	HMS Angling Permits by State (Principle State on Registration) in 2009.....	3-72
Table 3.29	Number of active shark dealer permits and other permits held by shark dealers by state as of November 6, 2009.....	3-73
Table 3.30	Number of Exempted Fishing Permits (EFPs), Display Permits, Scientific Research Permits (SRPs), Letters of Acknowledgement (LOAs) issued between 2003 and 2009.....	3-75
Table 3.31	Number of Registered HMS Tournaments by State between 2001 and 2008. ...	3-77
Table 3.32	Number and Percent of All HMS Tournaments Awarding Points or Prizes for a HMS, 2006-2008.....	3-78
Table 3.33	Registered Pelagic Shark Tournaments, 2008. ....	3-79
Table 3.34	Registered Large Coastal Shark (ridgeback and non-ridgeback) Tournaments, 2008.....	3-79
Table 3.35	Registered Small Coastal Shark Tournaments, 2008.....	3-80
Table 3.36	Inflation Price Indexes. The CPI-U is the standard Consumer Price Index for all urban consumers (1982-1984=100) produced by U.S. Department of Labor Bureau of Labor Statistics.....	3-81
Table 3.37	Average ex-vessel prices per lb (in U.S. dollars) for shark by area.....	3-82
Table 3.38	Estimates of the total ex-vessel annual revenues of Atlantic shark fisheries. ...	3-84
Table 3.39	The overall average wholesale price per lb of fresh HMS sold in Atlantic and Gulf of Mexico states as reported by the Fulton Fish Market.....	3-85
Table 3.40	Average Atlantic HMS charterboat rates for day trips. ....	3-86
Table 3.41	Amount and Value of U.S. Shark Product Exports From 1999-2008. ....	3-94
Table 3.42	U.S. Imports of Shark Products From All Ocean Areas Combined: 1999-2008.....	3-95
Table 3.43	Summary of bycatch species in HMS fisheries, Marine Mammal Protection Act (MMPA) category, Endangered Species Act (ESA) requirements, data collection, and management measures by fishery/gear type. ....	3-106
Table 3.44	Estimated sea turtle interactions by species in the US Atlantic pelagic longline fishery, 1999-2008, and Incidental Take Levels (ITS). ....	3-116

Table 3.45	Estimates of bycatch (numbers of fish) of small coastal sharks in the U.S. south Atlantic and Gulf of Mexico shrimp trawl fisheries and bottom longline fishery relative to total catch.....	3-117
Table 3.46	Estimates of bycatch (numbers of fish) of blacknose sharks in the U.S. south Atlantic and Gulf of Mexico shrimp trawl fisheries and bottom longline fishery relative to total catch.....	3-117
Table 3.47	Total number of swordfish, bluefin tuna, yellowfin tuna, bigeye tuna, total BAYS (bigeye, albacore, yellowfin and skipjack tuna), reported landed or discarded in the U.S. Atlantic PLL fishery, 1997 – 2008, and percent change from 1997-99. ....	3-121
Table 4.1	Sources of blacknose shark mortality, 1999-2005.....	4-6
Table 4.2	Average commercial landings of SCS from 2004-2008 in mt dw (lb dw). ....	4-9
Table 4.3	Estimated landings and discards of blacknose sharks and non-blacknose SCS under alternative A3.....	4-10
Table 4.4	Estimated landings and discards of blacknose sharks and non-blacknose SCS under alternative A4.....	4-12
Table 4.5	Estimated landings and discards of blacknose sharks and non-blacknose SCS under Alternative A6.....	4-14
Table 4.6	Estimated Commercial Catches (mt) (ww) of Shortfin Mako Shark Reported to ICCAT (landings and discards) by Major Gear and Flag between 1997 and 2008 (NLD=No Landing Data).....	4-28
Table 4.7	Comparison of commercial size limits for shortfin mako sharks (SFM), and their estimated affect on shortfin mako shark live releases. ....	4-33
Table 4.8	Comparison of commercial size limits for shortfin mako sharks (SFM), and their estimated affect on shortfin mako shark dead discards. ....	4-33
Table 4.9	Estimates of commercial and recreational landings and dead discards for shortfin mako sharks in the U.S. Atlantic, Gulf of Mexico, and Caribbean. (Source: ICCAT 2009) .....	4-36
Table 4.10	Estimates of shortfin mako shark landings (lb dw) reductions according to size restrictions in alternatives C4a and C4b. ....	4-40
Table 4.11	Percentage of shortfin mako sharks with FL measurements reported as landed to the LPS from 2004 to 2008 under the current size limit and size limits in alternatives E2a and E2b.....	4-47
Table 4.12	Total number of shortfin mako sharks reported to the LPS from 2004 to 2008.....	4-50
Table 4.13	Comparison of the impacts of analyzed alternatives. ....	4-84
Table 6.1	Number of Shark Limited Access Permits holder between 2004 and 2009. ....	6-1
Table 6.2	Number of CHB Permits by Year in 2009-2006. ....	6-2
Table 6.3	Number of shark dealer permits issued from 2004-2009. The actual number of permits per region may change as permit holders move or sell their businesses. ....	6-2
Table 6.4	Estimates of the total ex-vessel annual revenues of Atlantic Shark HMS fisheries. Sources: NMFS 2008; Cortés, 2003; Cortés and Neer, 2002, 2005; Cortés, pers.comm. ....	6-3
Table 6.5	Ex-vessel prices per pound dress weight for shark complexes from 2004-2007.....	6-4

Table 6.6	Ex-vessel prices per pound dress weight for proposed shark species quotas from 2004-2007. ....	6-4
Table 6.7	Median real ex-vessel prices for shark species groups from 2004-2007. Prices adjusted to December 2007 dollars using CPI-U. ....	6-4
Table 6.8	Average ex-vessel prices and average annual gross revenues from 2004-2007 under the No Action alternative, A1. Shark fins are assumed to be 5 percent of the carcass weight. ....	6-6
Table 6.9	Average ex-vessel prices and average annual gross revenues from 2004-2007 under alternative A2. Shark fins are assumed to be 5 percent of the carcass weight. ....	6-8
Table 6.10	Average ex-vessel prices and average annual gross revenues from 2004-2007 under alternative A3. Shark fins are assumed to be 5 percent of the carcass weight. ....	6-10
Table 6.11	Average ex-vessel prices and average annual gross revenues for entire fishery from 2004-2007 under alternative A4. Shark fins are assumed to be 5 percent of the carcass weight. ....	6-13
Table 6.12	Lost average annual gross revenues (from 2004-2007) for vessels that fish for non-blacknose SCS and blacknose sharks with gillnet gear under alternative A4. Shark fins are assumed to be 5 percent of the carcass weight. ....	6-16
Table 6.13	Lost average annual gross revenues (from 2004-2007) for vessels that fish for LCS with gillnet gear under alternative A4. Shark fins are assumed to be 5 percent of the carcass weight. ....	6-18
Table 6.14	Average annual gross revenues (from 2004-2007) of vessels that land LCS but do not use gillnet gear under alternative A4. Shark fins are assumed to be 5 percent of the carcass weight. ....	6-19
Table 6.15	Lost average annual gross revenues (from 2004-2007) for vessels landings non-blacknose SCS, blacknose sharks, and LCS under alternative A5. Shark fins are assumed to be 5 percent of the carcass weight. ....	6-21
Table 6.16	Average ex-vessel prices and average annual gross revenues from 2004-2007 under alternative A6. Shark fins are assumed to be 5 percent of the carcass weight. ....	6-23
Table 6.17	Estimates of shortfin mako shark landings (lb dw) reductions according to size restrictions in alternatives C4a and C4b. ....	6-29
Table 6.18	Total number of shortfin mako sharks reported to the LPS from 2004 to 2008. ....	6-31
Table 7.1	Net Economic Benefits and Costs of Alternatives. ....	7-3
Table 12.1	Individuals that submitted written public comment for Draft Amendment 3 to the 2006 Consolidated HMS FMP. ....	12-3
Table A.1	Number of blacknose sharks discarded alive, dead, and mortality rate for all gillnet gears based on 165 observed trips through the Gillnet Observer Program from 2005-2008. ....	A-3
Table A.2	Percentages of shark species (individuals) caught in shark trips that directed on specific species based on 2005-2008 Shark Observer Program data. ....	A-3
Table A.3	Average landings from 1999-2005 and available commerical landings for blacknose sharks based on a 78% reduction for all gear types. ....	A-8

Table A.4	Average landings from 1999-2005 and available commercial landings for blacknose sharks based on a 78% reduction for all gears with no landings from gillnets.....	A-8
Table A.5	Retention limits, discards, and total mortality of blacknose sharks per year under different scenarios for alternative A2.....	A-9
Table A.6	Percent reductions in non-blacknose SCS quotas based on average landings from 2004-2008 under alternative A3.....	A-14
Table A.7	Percent reductions in non-blacknose SCS quotas based on average landings from 2004-2008 under alternative A4.....	A-14
Table A.8	Blacknose shark harvest and discards under alternative A3.....	A-15
Table A.9	Blacknose shark harvest and discards under alternative A4.....	A-16
Table A.10	Total blacknose mortality under different non-blacknose SCS quota reductions for alternative A3.....	A-17
Table A.11	Total blacknose mortality under different non-blacknose SCS quota reductions for alternative A4.....	A-17



## MASTER LIST OF FIGURES

Figure 1.1	Generalized mechanism for establishing ABCs/ACLs under Amendment 3.....	1-9
Figure 2.1	Neonate blacknose shark interactions.....	2-23
Figure 2.2	Juvenile blacknose shark interactions.....	2-24
Figure 2.3	Neonate and juvenile blacknose interactions relative to the 20 fathom line.....	2-25
Figure 2.4	Observed BLL sets from 1994-2007 relative to the 20 fathom line.....	2-26
Figure 2.5	Observed BLL sets from 1994-2007 relative to the 50 fathom line.....	2-27
Figure 3.1	Illustration of the status determination and rebuilding terms.....	3-13
Figure 3.2	Observed sea turtle interactions in the shark BLL fishery from 1994-2008.....	3-33
Figure 3.3	Observed sawfish interactions in the shark BLL fishery from 1994-2008.....	3-34
Figure 3.4	Typical U.S. PLL Gear.....	3-45
Figure 3.5	Aggregate Distribution of Hooks Deployed by All ICCAT Parties 2000-2006.....	3-52
Figure 4.1	Interdorsal length measurement used for shortfin mako size limit analysis in alternatives C4a and C4b.....	4-31
Figure 11.1	Smooth dogfish observations from fisheries independent surveys.....	11-4
Figure 11.2	Smooth dogfish EFH designation based on fisheries independent surveys.....	11-5



## List of Commonly Used Abbreviations and Acronyms

AA	Assistant Administrator for Fisheries
ABC	Allowable biological catch
ACCSP	Atlantic Coastal Cooperative Statistics Program
ACS	Angler consumer surplus
ACL	Annual Catch Limit
ACTs	Allowable catch targets
ALRS	Automated Landings Reporting System
ALS	Accumulative Landings System
ALWTRP	Atlantic Large Whale Take Reduction Plan
ALWTRT	Atlantic Large Whale Take Reduction Team
AMs	Accountability Measures
ANPR	Advanced Notice of Proposed Rulemaking
AOCTRP	Atlantic Offshore Cetacean Take Reduction Plan
AOCTRT	Atlantic Offshore Cetacean Take Reduction Team
AP	Advisory Panel
APA	Administrative Procedure Act
ASA	American Sportfishing Association
ASMFC	Atlantic States Marine Fisheries Commission
ATCA	Atlantic Tunas Convention Act
AVHRR	Advanced Very High Resolution Radiometer
B	Biomass
$B_{MSST}$	Biomass of the minimum stock size threshold
$B_{MSY}$	Biomass expected to yield maximum sustainable yield
$B_{OY}$	Biomass expected to yield optimum yield
BAYS	Bigeye, albacore, yellowfin, skipjack tunas
BDTRP	Bottlenose Dolphin Take Reduction Plan
BDTRT	Bottlenose Dolphin Take Reduction Team
BET	Bigeye tuna
BETYP	Bigeye Tuna Year Program
BFT	Bluefin tuna
BiOp	Biological Opinion
BLL	Bottom Longline
BSD	Bluefin Tuna Statistical Document
BTF	By the fish
BUM	Blue marlin
CAR	Caribbean Statistical Area
CBP	Customs and Border Protection
Census Bureau	U.S. Bureau of the Census

CFDBS	Commercial Fisheries Database System
CFMC	Caribbean Fishery Management Council
CFL	Curved fork length
CFR	Code of Federal Regulations
CHB	Charter/Headboat
CHRA	Cape Hatteras Special Research Area
CIAT	Spanish for IATTC
CIE	Center for Independent Experts
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CL	Carcass length
COASTSPAN	Cooperative Atlantic States Shark Pupping and Nursery Survey
COE	Certificate of Eligibility
COFI	Committee on Fisheries
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CPI	Consumer Price Index
CPUE	Catch per unit effort
CSFOP	Commercial Shark Fishery Observer Program (run by University of Florida)
CSR	Center for Shark Research
CSTP	Cooperative Shark Tagging Program
CV	Coefficient of Variation
CZMA	Coastal Zone Management Act
DEA	Data Envelopment Analysis
DEIS	Draft Environmental Impact Statement
DPS	Distinct Population Segment
DRG	Dredge
DSGFOP	Directed Shark Gillnet Fishery Observer Program
dw	Dressed weight
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFC	East Florida Coast closed area
EFH	Essential fish habitat
EFP	Exempted fishing permit
EIS	Environmental Impact Statement
EO	Executive Order
ERA	Ecological Risk Assessments
ESA	Endangered Species Act
F	Instantaneous fishing mortality
F <sub>MSY</sub>	Instantaneous fishing mortality rate expected to yield maximum sustainable yield
F <sub>OY</sub>	Fishing mortality rate expected to yield optimum yield

FAD	Fish aggregating device
FAO	Food and Agriculture Organization
FAS	Free Alongside Ship
FCZ	Fishery Conservation Zone
FEC	Florida East Coast Statistical Area
FEIS	Final Environmental Impact Statement
FL	Fork length
FMP	Fishery management plan
FMU	Fishery management unit
FR	Federal Register
FRFA	Final regulatory flexibility analysis
GDP	Gross Domestic Product
GIS	Geographic Information System
GLM	Generalized Linear Models
GOM	Gulf of Mexico
GSAFDF	Gulf and South Atlantic Fishery Development Foundation
GMFMC	Gulf of Mexico Fishery Management Council
GSMFC	Gulf States Marine Fisheries Commission
GulfFIN	Gulf of Mexico commercial Fishery Information Network
HACCP	Hazard Analysis Critical Control Point
HAPC	Habitat Area Of Particular Concern
HB	Hierarchical-Bayesian
HBS	Headboat Survey, Southeast
HMS	Highly migratory species: Atlantic sharks, tunas, swordfish, and billfish
HPTRP	Harbor Porpoise Take Reduction Plan
HPTRT	Harbor Porpoise Take Reduction Team
HTS	Harmonized Tariff Schedule
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
IDL	Interdorsal length
IFQ	Individual Fishing Quota
ILAP	Initial limited access permit
IMARPE	Instituto del Mar del Peru
INP	Instituto Nacional de Pesca
IPOA	International Plan of Action
IRFA	Initial regulatory flexibility analysis
ITP	International Trade Permit
ITQ	Individual transferable quota
ITS	Incidental take statement

IUU	Illegal, Unregulated, and Unreported
kg	Kilogram
LAP	Limited access permit
LAPP	Limited access privilege program
LCS	Large coastal sharks
LJFL	Lower jaw fork length
LOA	Letter of Acknowledgment
LOF	List of Fisheries
LPS	Large Pelagic Survey
M	Mortality
MAB	Mid-Atlantic Bight Statistical Area
MAFMC	Mid-Atlantic Fishery Management Council
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MDMF	Massachusetts Division of Marine Fisheries
MFMT	Maximum fishing mortality threshold
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
MPA	Marine protected area
MRFSS	Marine Recreational Fishing Statistics Survey
MSL	Mississippi Laboratories, SEFSC, NMFS
MSRA	Magnuson-Stevens Fishery Conservation and Management Reauthorization Act
MSST	Minimum stock size threshold
MSY	Maximum sustainable yield
mt	Metric tons
NAS	National Academy of Sciences
NCA	North Central Atlantic
NEC	Northeast Coastal Statistical Area
NED	Northeast Distant Statistical Area
NEFMC	New England Fishery Management Council
NEFSC	Northeast Fisheries Science Center, NMFS
NEPA	National Environmental Policy Act
NERO	Northeast Regional Office, NMFS
NFRDI	National Fisheries Research and Development Institute
NGO	Non-governmental organization
NMFS	National Marine Fisheries Service
nmi	Nautical mile
NOA	Notice of Availability
NOAA	National Oceanographic and Atmospheric Administration
NOI	Notice of Intent

NPOA	National Plan of Action
NRC	Natural Resources Consultants, Inc.
NS	National Standards
NS 1	National Standard 1 Guidelines
NWGB	National Working Group on Bycatch
NYB	New York Bight
OFL	Overfishing limit
OPR	Office of Protected Resources
OSF	Office of Sustainable Fisheries
OY	Optimum yield
PAT	Pop-up archival tag
PDF	Personal flotation device
PIFSC	Pacific Islands Fisheries Science Center
PLL	Pelagic longline
PLTRP	Pelagic Longline Take Reduction Plan
PLTRT	Pelagic Longline Take Reduction Team
PMP	Preliminary Fishery Management Plan
POP	Pelagic observer program
PPI	Producer price index
PRA	Paperwork Reduction Act
PRD	Protected Resources Division
PRM	Post-release mortality
PSA	Productivity and Susceptibility Analysis
PSAT	Pop-up satellite archival tag
RBS	Recreational Billfish Survey
RFA	Regulatory Flexibility Act
RIR	Regulatory Impact Review
RFMC	Regional Fishery Management Council
RFMO	Regional Fishery Management Organizations
RPAs	Reasonable and Prudent Alternatives
RPMs	Reasonable and Prudent Measures
RUM	Random utility model
S&T	NMFS' Science and Technology
SAB	South Atlantic Bight
SAFE Report	Stock Assessment and Fishery Evaluation Report
SAFMC	South Atlantic Fishery Management Council
SAI	Sailfish
SAR	Sargasso Sea
SARA	Species at Risk Act

SBR	Spawning Stock Biomass Ratio
SBRM	Standardized Bycatch Reporting Methodology
SCRS	Standing Committee for Research and Statistics
SCS	Small coastal sharks
SCUBA	Self contained underwater breathing apparatus
SD	Statistical document
SEAMAP	Southeast Area Monitoring and Assessment Program
Secretary	Secretary of Commerce
SEDAR	Southeast Data, Assessment, and Review
SEFSC	Southeast Fisheries Science Center, NMFS
SEIS	Supplemental Environmental Impact Statement
SEN	Seines
SERO	Southeast Regional Office, NMFS
SEW	Stock evaluation workshop
SFA	Sustainable Fisheries Act
SFL	Straight fork length
SFM	Shortfin mako
SK Program	Saltonstall-Kennedy Program
SPOT	Smart position or temperature transmitting
SRP	Scientific research permit
SSB	Spawning stock biomass
SSF	Spawning Stock Fecundity
SSN	Spawning Stock Number
SWFSC	Southwest Fisheries Science Center
T-NB	Truncated negative binomial
TAC	Total allowable catch
TAG	Tag-A-Giant
TAL	Total allowable landings
TCs	Terms and Conditions
TEDs	Turtle exclusion devices
TDRs	Temperature-depth recorders
TL	Total length
TRP	Take Reduction Plan
TUNS	Tuna North and Tuna South
TWL	Trawls
TXPWD	Texas Parks and Wildlife Department
UNK	Unknown
USFWS	United States Fish and Wildlife Service
USVI	U.S. Virgin Islands

VIMS	Virginia Institute of Marine Science
VMS	Vessel monitoring system
VTR	Vessel Trip Report, NMFS NER
WHM	White marlin
WPFMC	Western Pacific Fishery Management Council
WTP	Willingness to pay
ww	Whole weight
WWF	World Wildlife Fund
YFT	Yellowfin tuna
YOY	Young of the year
ZINB	Zero-inflated negative binomial
ZIP	Zero-inflated Poisson
ZMRG	Zero Mortality Rate Goal



**CHAPTER 1 TABLE OF CONTENTS**

**Chapter 1 Table of Contents..... 1-i**

**Chapter 1 List of Figures ..... 1-ii**

**1.0 Introduction..... 1-1**

    1.1 Brief History of This Amendment ..... 1-1

    1.2 Brief Management History ..... 1-4

    1.3 Rebuilding and Preventing Overfishing of Atlantic Sharks ..... 1-6

        1.3.1 The Mechanism for Establishing ACLs and AMs ..... 1-6

        1.3.2 Stock Status and Status Determination Criteria..... 1-9

        1.3.3 National Standard 1 and Determining the Rebuilding Timeframe ..... 1-11

        1.3.4 2007 Stock Assessment and Rebuilding Timeframe for Blacknose Sharks ..... 1-13

        1.3.5 Smooth Dogfish ..... 1-14

        1.3.6 2008 Stock Assessment for Shortfin Mako Sharks..... 1-16

    1.4 Purpose and Need ..... 1-17

        1.4.1 Need ..... 1-17

        1.4.2 Purpose and Objectives..... 1-18

    1.5 Other Considerations ..... 1-19

**Literature Cited ..... 1-21**

## **CHAPTER 1 LIST OF FIGURES**

Figure 1.1 Generalized mechanism for establishing ABCs/ACLs under Amendment 3..... 1-9

## 1.0 INTRODUCTION

### 1.1 Brief History of This Amendment

Atlantic Highly Migratory Species (HMS<sup>1</sup>) are managed under the dual authority of the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (Magnuson-Stevens Act) and the Atlantic Tunas Convention Act (ATCA). Under the Magnuson-Stevens Act, the National Marine Fisheries Service (NMFS) must, consistent with the National Standards, manage fisheries to maintain optimum yield (OY) on a continuing basis while preventing overfishing. Under ATCA, NMFS is authorized to promulgate regulations, as may be necessary and appropriate, to implement the recommendations from the International Commission for the Conservation of Atlantic Tunas (ICCAT). The management measures considered for this Fishery Management Plan (FMP) amendment and associated rulemaking, which address Atlantic sharks, are taken under the authority of the Magnuson-Stevens Act. In addition to the Magnuson-Stevens Act, any management measures must also be consistent with other applicable laws including, but not limited to, the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), and the Coastal Zone Management Act (CZMA). This document is prepared, in part, to comply with NMFS' responsibilities under NEPA, as implemented by the regulations published by the Council on Environmental Quality, 50 C.F.R. Parts 1501-1508 (CEQ Regs), and NMFS Administrative Order 216-6 (NAO 216-6).

In accordance with the requirements of NEPA, NMFS announced its intent to prepare an Environmental Impact Statement (EIS) for Amendment 3 to the 2006 Consolidated Atlantic HMS FMP on May 7, 2008 (73 FR 25665). In that notice, NMFS announced that blacknose sharks (*Carcharhinus acronotus*) are overfished with overfishing occurring and asked for comments on existing commercial and recreational shark management measures that would assist the Agency in determining options for conservation and management of blacknose sharks consistent with relevant federal statutes. NMFS announced the availability of a scoping document and details of five scoping meetings that were held from July through September 2008 (73 FR 37932, July 2, 2008; 73 FR 53407, September 13, 2008). NMFS also released a scoping presentation in conjunction with the Federal Register notice. In the presentation and at scoping meetings, NMFS described the results of recent stock assessments for small coastal sharks (SCS), alternatives that may be implemented to achieve management objectives and specifically presented options for management of blacknose sharks, pelagic sharks, and smooth dogfish (*Mustelus canis*). At the time of the release of that presentation, the shortfin mako (*Isurus oxyrinchus*) and blue shark (*Prionace glauca*) stock assessments were not completed. As such, at the scoping meetings, NMFS did not present specific issues and options regarding shortfin mako sharks and blue sharks. Additionally, NMFS was just beginning to consider adding smooth dogfish under NMFS management and while NMFS presented the idea during scoping, specific issues and options for smooth dogfish were not identified at that time.

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<sup>1</sup>The Magnuson-Stevens Act, at 16 U.S.C. 1802(14), defines the term "highly migratory species" as tuna species, marlin (*Tetrapturus* spp. and *Makaira* spp.), oceanic sharks, sailfishes (*Istiophorus* spp.), and swordfish (*Xiphias gladius*). Further, the Magnuson-Stevens Act, at 16 U.S.C. 1802(27), defines the term "tuna species" as albacore tuna (*Thunnus alalunga*), bigeye tuna (*Thunnus obesus*), bluefin tuna (*Thunnus thynnus*), skipjack tuna (*Katsuwonus pelamis*), and yellowfin tuna (*Thunnus albacares*).

NMFS released a Predraft of Amendment 3 to the 2006 Consolidated HMS FMP, which incorporated comments received during scoping, and a summary of the scoping comments to the HMS Advisory Panel (AP) on February 11, 2009. These documents were also made publically available on the HMS website. The Predraft included, among other things, the outcome of the shortfin mako, blue shark, and SCS stock assessments as well as potential management measures for SCS, shortfin mako, smooth dogfish, and deepwater sharks. NMFS requested that the AP and consulting parties (Atlantic, Gulf, and Caribbean Fishery Management Councils, Marine Fisheries Commissions, U.S. Coast Guard, and other State and Federal Agency representatives) submit comments on the Predraft by March 16, 2009.

Based on comments received during scoping and on the Predraft, NMFS determined the significant issues of concern that would be addressed in the draft amendment. The draft Amendment 3 and its proposed rule were released on July 24, 2009 (74 FR 36706 and 74 FR 36892). In large part because of the comments received on the draft Amendment 3, NMFS made changes to the alternatives considered in this final document.

Some issues in this amendment are driven by statutory mandates under the Magnuson-Stevens Act, such as rebuilding overfished blacknose sharks and ending overfishing of blacknose and shortfin mako sharks. Other issues are being addressed due to concerns raised by constituents, such as implementing federal management for smooth dogfish. In this final amendment, in addition to “no action” NMFS considers a full range of reasonable alternatives for several different issues including quota limits, commercial gear restrictions, establishing a rebuilding plan for overfished stocks, recreational measures, and management measures for smooth dogfish. The specific issues are:

- SCS Commercial Quotas (alternatives A1-A6): NMFS considers modifying the SCS and species-specific quotas for SCS in order to rebuild blacknose sharks and end overfishing of this species. The range of alternatives could have a variety of impacts on the human environment from neutral impacts to significant impacts (alternative A5). The preferred alternative, A6, would likely have significantly beneficial impacts on the human environment;
- Commercial Gear Restrictions (alternatives B1-B3): NMFS considers modifying the authorized gears that can be used to retain sharks in order to rebuild blacknose sharks and end overfishing of this species. The range of alternatives could have a variety of impacts on the human environment from no impacts to significant impacts (alternative B2). The preferred alternative, B1, would not have any additional significant impacts on the human environment;
- Commercial Pelagic Shark Effort Controls (alternatives C1-C6): NMFS considers modifying commercial regulations for shortfin mako sharks to end overfishing of this species. The range of alternatives could have a variety of impacts on the human environment from no impact to significant impacts (alternative C3). The preferred alternatives, C5 and C6, would likely have minor impacts on the human environment;
- Recreational SCS Measures (alternatives D1-D4): NMFS considered modifying recreational regulations for SCS, including blacknose and Atlantic sharpnose

*(Rhizoprionodon terraenovae)* sharks, to rebuild blacknose sharks and end overfishing of this species. The range of alternatives could have a variety of impacts on the human environment from no impact, to moderate impacts (alternative D4). The preferred alternative, D1, would not likely have impacts on the human environment;

- Recreational Pelagic Shark Measures (alternatives E1-E5); NMFS considers modifying recreational regulations for shortfin mako sharks to end overfishing of this species. The range of alternatives could have a variety of impacts on the human environment from no impact, to significant impacts (alternative E5). The preferred alternatives, E3 and E4, would likely have minor impacts on the human environment; and,
- Smooth Dogfish Measures (alternatives F1-F3); NMFS considers implementing federal management measures for smooth dogfish based on concerns from constituents that smooth dogfish may require conservation and management. The range of alternatives could have a variety of impacts on the human environment from no impact to moderate impacts (alternative F2 and sub-alternative F2a1). The preferred alternative, F2, and sub-alternatives F2a4 and F2b1, would likely have moderate impacts on the human environment.

The Magnuson-Stevens Act subsection 303(a)(9) requires any FMP to include a fishery impact statement which shall assess, specify, and analyze the likely effects, if any, including the cumulative conservation, economic, and social impacts, of the conservation and management measures on, and possible mitigation measures for:

- Participants in the fisheries and fishing communities affected by the plan or amendment;
- Participants in the fisheries conducted in adjacent areas under the authority of another Council, after consultation with such Council and representatives of those participants; and,
- The safety of human life at sea, including whether and to what extent such measure may affect the safety of participants in the fishery.

A similar analysis using much of the same economic and social data is necessary to ensure consistency with of the Magnuson-Stevens Act National Standard 8, which requires that conservation and management measures, including those developed to end overfishing and rebuild fisheries:

- Take into account the importance of fishery resources to fishing communities in order to provide for their sustained participation; and,
- To the extent practicable, minimize the adverse economic impacts on such communities.

Likewise, specific to development and amendment of HMS FMPs the Magnuson-Stevens Act, paragraph 304(g)(1)(C) requires the Secretary to:

- Evaluate the likely effects, if any, of conservation and management measures on participants in the affected fisheries; and,

- Minimize, to the extent practicable, any disadvantage to U.S. fishermen in relation to foreign competitors

The mandates of paragraphs 303(a)(9), 301(a)(8) and 304(a)(1)(C) are consistent with the requirements under NEPA for NMFS to identify and evaluate the direct, indirect and cumulative impacts of the proposed action on the social and economic elements of the human environment. This amendment, therefore, meets these multiple requirements with an integrated analysis focusing on the existing social and economic condition of the fisheries and affected fishing communities, determining the potential direct, indirect, and cumulative effects, and developing alternatives to mitigate adverse effects to the greatest extent practicable. The data and analyses necessary to support the foregoing requirements can be found in the following chapters. Chapter 3 provides a description of the fisheries that interact with blacknose, shortfin mako, and smooth dogfish sharks and participants in the fisheries conducted in adjacent areas under the authority of another Council. Chapter 3 also describes safety of human life at sea issues. Chapter 4 of this document provides the ecological, socio-economic, and cumulative impacts of the conservation and management measures on participants in the fisheries and fishing communities affected by this amendment. Finally, Chapter 5 discusses any mitigating measures regarding the preferred alternatives. This amendment also includes Chapter 2, which gives a description of the different alternatives for each issue, and Chapters 6, 7, and 8, which analyze the economic impacts of the alternatives and address the requirements of a Regulatory Impact Review (RIR) and Final Regulatory Flexibility Analysis (FRFA). Chapter 10 describes consistency with the National Standards, other requirements of the Magnuson-Stevens Act, and other applicable laws, and Chapter 11 describes essential fish habitat for smooth dogfish. Several appendices are also included to provide more information on specific calculations for different issues (Appendix A), a response by the NMFS Southeast Fisheries Science Center (SEFSC) on technical comments received during scoping (Appendix B), a formal response to the Mid-Atlantic Fishery Management Council regarding smooth dogfish management (Appendix C) and the response to comments received during the DEIS public comment period (Appendix D). NMFS has also included correspondence with the South Atlantic and Gulf of Mexico Fishery Management Councils regarding blacknose bycatch in South Atlantic and Gulf of Mexico shrimp trawls (Appendix E). NMFS has synthesized the foregoing data and analyses to meet the multiple legal requirements requiring evaluation of impacts and minimization of adverse impacts on fishing communities and participants in the shark fishery in the Final Fisheries Impact Statement in Chapter 9.

## **1.2 Brief Management History**

This section provides a brief overview of HMS management. More detail regarding the history of Atlantic shark management can be found in Section 3.1 and in the Consolidated HMS FMP and Amendments 1 and 2 to the Consolidated HMS FMP.

In 1989, the Regional Fishery Management Councils (RFMCs) requested that the Secretary of Commerce (Secretary) manage Atlantic sharks. On November 28, 1990, the President of the United States signed into law the Fishery Conservation Amendments of 1990 (Pub. L. 101-627). This law amended the Magnuson Fishery Conservation and Management Act (later renamed the Magnuson-Stevens Fishery Conservation and Management Act or Magnuson-

Stevens Act) and gave the Secretary the authority (effective January 1, 1992) to manage HMS in the exclusive economic zone (EEZ) of the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea under authority of the Magnuson-Stevens Act (16 U.S.C. §1811). This law also transferred from the Fishery Management Councils to the Secretary, effective November 28, 1990, the management authority for HMS in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea (16 U.S.C. §1854(f)(3)). At this time, the Secretary delegated authority to manage Atlantic HMS to NMFS. NMFS finalized a shark FMP in 1993. In 1999, NMFS revised the 1993 FMP and included swordfish and tunas in the 1999 FMP for Atlantic tunas, swordfish, and sharks (1999 FMP). The 1999 FMP was amended in 2003, and in 2006, NMFS consolidated the Atlantic tunas, swordfish, and shark FMP and its amendments and the Atlantic billfish FMP and its amendments to the 2006 Consolidated Atlantic HMS FMP. This amendment amends the 2006 Consolidated HMS FMP.

Under the Magnuson-Stevens Act, NMFS is responsible for managing HMS and must comply with all applicable provisions of the Magnuson-Stevens Act when it prepares and amends its FMP and implementing regulations (16 U.S.C. §1852(a)(3)). NMFS must maintain OY of each fishery while preventing overfishing (16 U.S.C. §1851(a)(1)). Where a fishery is determined to be in or approaching an overfished condition, NMFS must include in its FMP conservation and management measures to prevent or end overfishing and rebuild the fishery, stock or species (16 U.S.C. §§1853(a)(10); 1854(e)). If NMFS determines that a fishery is overfished or approaching an overfished condition due to excessive international fishing pressure and there are no management measures to end such overfishing in an international agreement to which the United States is a party, it must take action at the international level to end overfishing (16 U.S.C. §§1854, 1854 note). In preparing and amending an FMP, NMFS must, among other things, consider the National Standards, including using the best scientific information as well as the potential impacts on residents of different states, efficiency, costs, fishing communities, bycatch, and safety at sea (16 U.S.C. §1851(a)(1-10)). The Magnuson-Stevens Act also has a specific section that addresses preparing and implementing FMPs for Atlantic HMS (16 U.S.C. §1854(g)(1)(A-G)). In summary, the section includes, but is not limited to, requirements to:

- Consult with and consider the views of affected Councils, Commissions, and advisory groups;
- Evaluate the likely effects of conservation and management measures on participants and minimize, to the extent practicable, any disadvantage to U.S. fishermen in relation to foreign competitors;
- Provide fishing vessels with a reasonable opportunity to harvest any allocation or quota authorized under an international fishery agreement;
- Diligently pursue comparable international fishery management measures; and,
- Ensure that conservation and management measures promote international conservation of the affected fishery, take into consideration traditional fishing patterns of fishing vessels, are fair and equitable in allocating fishing privileges among U.S. fishermen and do not have economic allocation as the sole purpose, and promote, to the extent practicable, implementation of scientific research programs that include the tagging and release of Atlantic HMS.

### **1.3 Rebuilding and Preventing Overfishing of Atlantic Sharks**

Under National Standard (NS) 1 of the Magnuson-Stevens Act, as implemented by the National Standard 1 Guidelines (NSG1) (50 CFR 600.310), NMFS is required to “prevent overfishing while achieving, on a continuing basis, the OY from each fishery for the U.S. fishing industry.” In order to accomplish this, NMFS must determine the maximum sustainable yield (MSY) and specify status determination criteria (*i.e.*, maximum fishing mortality threshold and minimum stock size threshold) to allow a determination of the status of the stock. In cases where the fishery is overfished, NMFS must take action to rebuild the stock (by specifying rebuilding targets). In the 1999 FMP, and maintained in the 2006 Consolidated HMS FMP, NMFS outlined these status determination criteria and a set of rebuilding targets for all HMS. This amendment does not change these criteria or targets. In addition, Congress amended the Magnuson-Stevens Act in 2007 to require that each FMP establish a mechanism for specifying annual catch limits (ACLs) at a level that will prevent overfishing and include accountability measures (AMs) to ensure ACLs are not exceeded (16 U.S.C. §1853(a)(15)). NMFS must amend its HMS FMP to address these requirements for stocks currently experiencing overfishing by 2010, and for all other stocks beginning 2011 onward with the exception of those stocks not subject to international management. This document will amend the plan to include a mechanism to specify ACLs for stock complexes and certain specific shark species. It will also identify AMs. The regulations are necessary to adjust ACLs as needed and to apply AMs that already exist. No additional regulations would be necessary to implement these requirements.

#### **1.3.1 The Mechanism for Establishing ACLs and AMs**

On January 16, 2009, NMFS published NSG1 providing guidance for implementing the ACL and AM requirements of the Magnuson-Stevens Act (74 FR 3178). Per the January 2009 final rule, ACLs and AMs apply to all fisheries “unless otherwise provided for under an international agreement in which the United States participates.” While, SCS, large coastal sharks (LCS), and pelagic sharks are predominately managed through domestic management measures, in recent years ICCAT has issued a number of recommendations regarding sharks (*e.g.*, ICCAT recommendations 2004-10, 2005-05, 2007-06, 2008-07, 2009-07 for bigeye thresher shark (*Alopias superciliosus*)). Nevertheless, ACLs and AMs will apply, as required, to all Atlantic shark species managed by NMFS. These ACLs and AMs are described in Figure 1.1 and the text below.

According to the NSG1, ACLs and AMs are related to other reference points, including an overfishing limit (OFL) and allowable biological catch (ABC). OFL is greater than or equal to the ABC limit, which is greater than or equal to the ACL. As such, NMFS is establishing for all Atlantic sharks the following mechanism to use when establishing ACLs and applying AMs. NMFS considers the OFL to be the annual amount of catch that corresponds to the estimate of maximum fishing mortality threshold (MFMT) applied to the stock abundance. The ABC would be established to account for uncertainty in the assessment. Ideally, the actual ABC would be established as part of the stock assessment reports, results, and/or conclusions. However, because the current assessments predate NSG1 and because some stock assessments, particularly those done by ICCAT scientists, may not provide an ABC, until such a time that new stock assessments for HMS incorporate an estimate of ABC, NMFS is establishing the ABC equal to the ACL for sharks. This would ensure that the ABC is below the OFL, which is required under

NSG1, and should account for scientific uncertainty at a level that is acceptable given the biological characteristics of the species. Management uncertainty can be accounted for using some AMs (e.g., precautionary inseason management) or the use of ACTs less than a stock's ACL.

In general, the ACL is equivalent to the total allowable catch (TAC) for all fisheries that interact with a given shark species. The TAC, or ACL, is provided as part of the stock assessment report, results, and/or conclusions and is the level of mortality that is acceptable given the biological characteristics of the species that would allow a stock to rebuild or remain sustainable during a given timeframe. For overfished stocks, the ACL is equal to the stock assessment's projection that shows rebuilding with a 70-percent change of success. NMFS uses the 70 percent probability of rebuilding for sharks given their life history traits, such as late age of maturity and low fecundity (*i.e.*, instead of 50 percent, which is commonly used for other species). Additionally, NMFS may establish "sector-ACLs," such as recreational harvest, discards from other fisheries, and the commercial harvest. The commercial harvest would include discards and the "commercial landings components of the sector ACL," which would be the commercial landings quota for specific shark fisheries.

A number of shark stocks have not been individually assessed. Additionally, a number of shark stocks are managed in a complex as some species have not been individually assessed, such as oceanic whitetip (*Carcharhinus longimanus*) and common thresher sharks (*Alopias vulpinus*). As such, NMFS is establishing some exceptions to the above mechanism for establishing ACLs and AMs. For example, MSY, OY, and the status determination criteria for pelagic sharks have been defined in the 1999 FMP (see below) and do not change in this amendment. Additionally, quotas have been established for the pelagic shark complex and for blue and porbeagle sharks. For example, the original pelagic shark quota (which was comprised of common thresher, oceanic whitetip, blue, shortfin mako, and porbeagle sharks) was based on mean landings from 1986-1991 (580 mt dw). In the 1999 FMP, the current pelagic quota was established by subtracting the porbeagle quota of 92 mt dw from the pelagic sharks quota, resulting in an annual quota of 488 mt dw (a separate set-aside was also established for blue shark discards under the 1999 FMP). The porbeagle quota has since been reduced to 1.7 mt dw per year, and a TAC has been established at 11.3 mt dw, which would be equivalent to the ACL for porbeagle sharks. NMFS believes that these levels of catch for pelagic sharks are acceptable given the biological characteristics of the stocks or stock complex. As such, given that the current commercial quotas and recreational bag limits serve as limits on catch and prevent overfishing, in the absence of a specific TAC, NMFS considers these quotas to be equivalent to the ACL, ABC, and TAC for pelagic sharks. As needed and required, NMFS can adjust these ACLs and apply AMs.

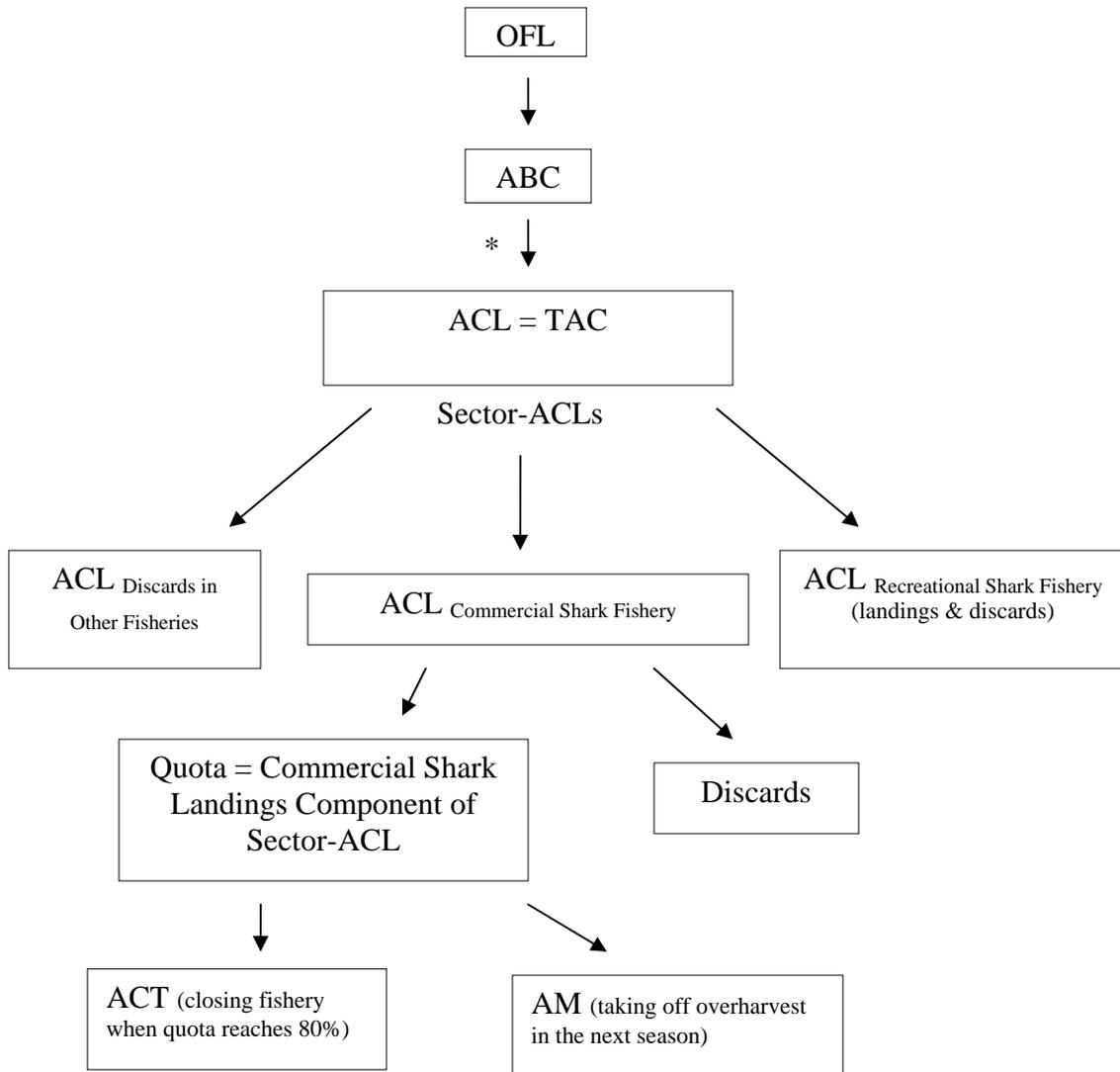
For sharks, the quotas are generally for the commercial fishery, not the recreational fishery. NMFS has not established quotas for the recreational shark fishery due to the difficulty in estimating recreational catches in real time, but may consider doing so in the future. While the shark recreational fishery does not have a formal quota, catches within the recreational shark fishery are considered when stock assessments are conducted and are taken into account when NMFS establishes the OFL, ABC, ACL, and TAC. NMFS also takes the recreational catches, along with discards from the commercial sector, into account when establishing the commercial

quota or “commercial landings components of the ACL.” Because sector ACLs are being used, sector AMs would also be used. This action would change the quotas for SCS and establish a commercial quota for smooth dogfish. It does not change the quotas that were previously established for LCS and pelagic sharks.

NSG1 also requires NMFS to establish AMs. NMFS already has AMs along with measures analogous to annual catch targets (ACTs) in place in commercial Atlantic shark fisheries. Specifically, NMFS closes the quota for each shark species/complex with five days notice upon filing in the Federal Register when 80 percent of a given quota is filled or projected to be reached. Eighty percent of the shark quota is, therefore, the ACT. An example of a postseason AM currently in the HMS FMP for these fisheries is overharvests of the commercial quotas are removed from the next fishing year’s quota. In addition, underharvests for shark species that are not overfished or are not experiencing overfishing are added to the base quota the following year and carry forward is capped at 50 percent of the base quota. There is no carryover of underharvests for species that are unknown, overfished, or experiencing overfishing. The measures considered in this final Amendment 3 to the Consolidated HMS FMP do not change these AMs.

In summary, this amendment and associated rulemaking establishes the mechanism for specifying ACLs as required by Section 303(a)(15) of the statute and is consistent, to the greatest extent practicable with NSG1; establishes new quotas for SCS and smooth dogfish following these methods; and maintains the current quotas for LCS and pelagic sharks, consistent with these methods. Quotas, or landings component of the sector ACL, would be adjusted annually for over- and underharvests from the previous fishing year. ACLs are adjusted based on the result of stock assessments, which are usually done through a FMP amendment. In short, for all HMS managed sharks, with the exceptions noted above, the methods are:

- $OFL > ABC \geq ACL$  (until estimates of ABC are available);
- $OFL$  = the annual amount of catch that corresponds to the estimate of MFMT applied to a stock’s abundance relative to the level of fishing mortality (F);
- $ABC$  = to be determined by future stock assessments, as appropriate; in the interim, NMFS assumes  $ABC = ACL$ ;
- $ACL = TAC$ ; for overfished stocks this will be the projection that shows 70 percent probability of rebuilding;
- Commercial quota = landings component of the sector ACL; and
- AMs = restrictions on use of over- and underharvests and closing the fishery when commercial landings are at or projected to be at 80 percent of the quota.



**Figure 1.1** Generalized mechanism for establishing ABCs/ACLs under Amendment 3.  
 \* Currently, ACL=ABC as no ABC has been designated in recent shark stock assessments; future shark stock assessments will be asked to identify an ABC.

### 1.3.2 Stock Status and Status Determination Criteria

According to the definition in 50 C.F.R. §600.310(e)(2)(i)(B) of NSG1, overfishing occurs whenever a stock or stock complex is subjected to a level of fishing mortality or annual total catch that jeopardizes the capacity of a stock or stock complex to produce MSY on a continuing basis. The 1999 FMP established the maximum fishing mortality threshold (MFMT) as  $F_{MSY}$ .  $F_{MSY}$  is defined as the fishing mortality level necessary to produce MSY on a continuing basis. If the MFMT exceeds  $F_{MSY}$  for more than one year, then the stock is considered to be subject to overfishing, and remedial action must be taken. This is the current situation for blacknose and shortfin mako sharks.

The 1999 FMP established the minimum stock size threshold (MSST) as  $(1-M)B_{MSY}$  when natural mortality (M) is less than 0.5. Most species of sharks have M less than 0.5. When the stock falls below MSST, the stock is overfished and remedial action must be taken to rebuild the stock. This is the current situation for blacknose sharks.

Stocks are considered rebuilt when current biomass levels are greater than or equal to  $B_{MSY}$ .  $B_{MSY}$  is the level of stock abundance at which harvesting the resource can be sustained on a continual basis at the level necessary to support MSY. Stocks are considered healthy when F is less than or equal to  $0.75 F_{MSY}$  and B is greater than or equal to  $B_{OY}$  (the biomass level necessary to produce OY on a continuing basis). Finetooth (*Carcharhinus isodon*), bonnethead (*Sphyrna tiburo*), Atlantic sharpnose (*Rhizoprionodon terraenovae*), and blue sharks are considered healthy; however, the 2007 assessments for finetooth, bonnethead, and Atlantic sharpnose sharks recommended cautious management measures for these three species based on trends of  $B_{MSY}$  and  $F_{MSY}$  for all species (NMFS, 2007). In summary, the thresholds used to calculate the status of Atlantic sharks are as follows:

- $MFMT = F_{limit} = F_{MSY}$ ;
- Overfishing is occurring when  $F_{year} > F_{MSY}$ ;
- $MSST = B_{limit} = (1-M)B_{MSY}$  when  $M < 0.5 = 0.5B_{MSY}$  when  $M \geq 0.5$ ;
- Overfished when  $B_{year}/B_{MSY} < MSST$ ;
- Biomass target during rebuilding =  $B_{MSY}$ ;
- Fishing mortality during rebuilding  $< F_{MSY}$ ;
- Fishing mortality for healthy stocks =  $0.75F_{MSY}$ ;
- Biomass for healthy stocks =  $B_{OY} = \sim 1.25$  to  $1.30B_{MSY}$ ;
- Minimum biomass flag =  $(1-M)B_{OY}$ ; and
- Level of certainty of *at least* 50 percent but depends on species and circumstances; for sharks, the level of certainty is 70 percent.
- For sharks, in some cases, spawning stock fecundity (SSF) or spawning stock number (SSN) is used as a proxy for biomass since biomass does not influence pup production in sharks.

The latest stock assessment of SCS in the U.S. Atlantic and Gulf of Mexico was completed in 2007 (72 FR 63888, November 13, 2007). This peer-reviewed assessment, which was conducted according to the Southeast Data, Assessment, and Review (SEDAR) process, provides an update from the 2002 stock assessment on the status of SCS stocks and projects their future abundance under a variety of catch levels in the U.S. Atlantic Ocean, Gulf of Mexico, and Caribbean Sea. The 2007 assessment includes updated catch estimates, new biological data, and a number of fishery-independent catch rate series, as well as fishery-dependent catch rate series, and is considered the best available science.

The peer reviewers determined that the data used in the 2007 stock assessment of the SCS complex and the individual species within the complex were the best available at the time,

and the assessment was considered adequate. However, because the species were individually assessed, the peer reviewers recommended using species-specific results rather than the aggregated SCS complex results. This does not preclude NMFS from managing SCS as a complex. Therefore, NMFS is examining alternative options to managing the SCS complex as a whole as well as species-specific management for blacknose sharks, which are described in more detail in Chapters 2 and 4.

In addition, the NMFS SEFSC has been working with industry scientists to re-evaluate the shrimp bycatch models used in the 2007 SCS stock assessments. In particular, they have been evaluating the effect of turtle exclusion devices, or TEDs, on SCS bycatch in shrimp trawls. Once the SEFSC has finished their evaluation of those models, NMFS could revise blacknose shark bycatch estimates. Preliminary results suggest that the post-TED (*i.e.*, from 1990 on) reduction in bycatch from the model currently in development is approximately 50 percent. The NMFS SEFSC has also run sensitivity analyses to determine the effect of reduced blacknose bycatch in shrimp trawls on the stock status of blacknose sharks. Although stock status improves, despite reductions in shrimp trawl bycatch of 25, 50, and 75 percent, the stock continues to be overfished ( $N_{2005}/N_{MSY} = 0.66$  to  $0.74$  versus  $0.48$  in the baseline assessment run from the 2007 blacknose shark stock assessment) with overfishing occurring ( $F_{2005}/F_{MSY} = 2.67$  to  $2.21$  versus  $3.77$  in the baseline assessment run from the 2007 blacknose shark stock assessment) (see Appendix B). Depending on the results of these evaluations, NMFS may need to work with the Councils to reduce bycatch of blacknose sharks in shrimp trawls, as appropriate. These preliminary results should not be considered the best available data as they have not gone through a peer-reviewed stock assessment process, rather they will help inform the next blacknose shark stock assessment.

In 2008, the ICCAT's Standing Committee on Research and Statistics (SCRS) conducted an updated species-specific stock assessment for North Atlantic shortfin mako sharks. The ICCAT stock assessment found that the North Atlantic shortfin mako sharks are experiencing overfishing and are not overfished, but are approaching an overfished status; however, the assessment gave no biological benchmarks in terms of a TAC (or ACL) or ABC. NMFS has determined that the ICCAT assessment is the best available science and has determined domestically that shortfin mako sharks have overfishing occurring but are not overfished (June 19, 2009, 74 FR 29185). Based on this determination, NMFS is considering a range of alternatives to help stop overfishing of shortfin mako sharks and rebuild the stock, if necessary, through efforts at the international level. These alternatives are described in more detail in Chapter 2 and 4.

### **1.3.3 National Standard 1 and Determining the Rebuilding Timeframe**

Pursuant to subsection 304(e) of the Magnuson-Stevens Act, as implemented by NSG1, if a stock is overfished, NMFS is required to "prepare an FMP, FMP amendment, or proposed regulations... to specify a time period for ending overfishing and rebuilding the stock or stock complex that will be as short as possible as described under section 304(e)(4) of the Magnuson-Stevens Act." (50 CFR 600.310(j)(2)(ii)). A rebuilding ABC must be set to reflect the annual catch that is consistent with the schedule of the fishing mortality rates in the rebuilding plan. The timeframe to rebuild the stock or stock complex must specify a time period that is as short as possible taking into account a number of factors including:

- The status and biology of the stock or stock complex;
- Interactions between the stock or stock complex and other components of the marine ecosystem;
- The needs of the fishing communities;
- Recommendations by international organizations in which the United States participates; and
- Management measures under an international agreement in which the United States participates.

The rebuilding target may not exceed ten years, unless dictated otherwise by:

- The biology of the stock or complex of fish;
- Other environmental conditions; or,
- Management measures under an international agreement in which the United States participates.

The lower limit of the specified time frame for rebuilding is determined by the status and biology of the stock and is defined as "...the amount of time the stock or stock complex is expected to take to rebuild to its MSY biomass level in the absence of any fishing mortality" (50 CFR 600.310 (j)(3)(i)(A)).

The NSG1 specify two strategies for determining the rebuilding time frame depending on the lower limit of the specified time frame for rebuilding. The first strategy (50 CFR 600.310 (j)(3)(i)(C)) states that:

"If  $T_{\min}$  [minimum time for rebuilding a stock] for the stock or stock complex is 10 years or less, then the maximum time allowable for rebuilding ( $T_{\max}$ ) that stock to its  $B_{\text{MSY}}$  is 10 years."

The second strategy (50 CFR 600.310 (j)(3)(i)(D)), which is applicable for most species of sharks because the lower limit is generally greater than 10 years, specifies that:

"If  $T_{\min}$  for the stock or stock complex exceeds 10 years, then the maximum time allowable for rebuilding a stock or stock complex to its  $B_{\text{MSY}}$  is  $T_{\min}$  plus the length of time associated with one generation time for that stock or stock complex. 'Generation time' is the average length of time between when an individual is born and the birth of its offspring."

The 1999 FMP established that management measures for Atlantic tunas, swordfish, and sharks should have at least a 50 percent chance of reaching the target reference points used in developing rebuilding projections. This target is consistent with the technical guidelines for NSG1 (Restrepo et al, 1998). However, compared to other HMS and fish species, many shark

species are slow growing, take a long time to mature, have few pups, and generally reproduce every two or three years (*e.g.*, the blacknose shark has an average of three pups every year in the Gulf of Mexico region and three pups every other year in the South Atlantic region). Due to these life history traits, many shark species have a low reproductive potential. Thus, as described in past FMPs regarding sharks, NMFS uses a 70-percent probability to determine the rebuilding plan for sharks to ensure that the intended results are actually realized.

#### **1.3.4 2007 Stock Assessment and Rebuilding Timeframe for Blacknose Sharks**

The 2007 stock assessment of SCS in the U.S. Atlantic and Gulf of Mexico consisted of assessments for blacknose sharks, finetooth sharks, bonnethead sharks, Atlantic sharpnose sharks, and the SCS complex. Results of the blacknose shark stock assessment determined that blacknose sharks are overfished ( $\text{Spawning Stock Fecundity (SSF)}_{2005}/\text{SSF}_{\text{MSY}} = 0.48$ ) and overfishing is occurring ( $F_{2005}/F_{\text{MSY}} = 3.77$ ). The assessment recommended a blacknose shark specific TAC and a corresponding rebuilding timeframe. Because a separate TAC was recommended for blacknose sharks, NMFS is creating a separate rebuilding plan for blacknose sharks in this amendment. One objective of this amendment is to ensure that fishing mortality levels for blacknose sharks are maintained at or below levels that would result in a 70 percent probability of rebuilding in the timeframe recommended by the assessment.

The stock assessment discussed three rebuilding scenarios, including: 1) a rebuilding timeframe under no fishing, 2) a TAC corresponding to a 50 percent probability of rebuilding, and 3) a TAC corresponding to a 70 percent probability of rebuilding. Under no fishing, the stock assessment estimated that blacknose sharks would rebuild in 11 years. Adding a generation time (8 years), as described under NSG1 for species that require more than 10 years to rebuild even if fishing mortality were eliminated entirely, the target year for rebuilding the stock was estimated to be 2027 (8 years mean generation time + 11 years to rebuild if fishing mortality is eliminated = 19 years including 2009). Because the assessment did not have estimates of fishing mortality for 2006 and beyond at the time of the assessment, NMFS assumed that fishing mortality in 2006 was the same as in 2005 and declined by 50 percent from 2005 levels in 2007-2009 (to account for presumed reduction in effort due to Hurricane Katrina). NMFS determined that a constant TAC, or ACL (*i.e.*, ACL for all fisheries that interact with blacknose sharks), of 19,200 blacknose sharks per year would lead to rebuilding with a 70 percent probability by 2027. This is the shortest possible time necessary to rebuild the species as dictated by the species' biology described above. Rebuilding with this same TAC would occur with a 50 percent probability by 2024. As described previously, NMFS is using the 70 percent probability of rebuilding to ensure that the intended results of a management action are actually realized given the life history traits of sharks.

According to the latest blacknose shark stock assessment, an average of 86,381 blacknose sharks were killed each year between 1999-2005 in different fisheries either as targeted catch or as bycatch. In order to attain the recommended blacknose shark TAC of 19,200 individuals, NMFS needs to reduce blacknose shark mortality by at least 78 percent across all fisheries that interact with blacknose sharks ( $((86,381 - 19,200)/86,381) \times 100 \text{ percent} = 78 \text{ percent}$ ). Based on data used in the 2007 blacknose shark stock assessment, approximately 45 percent of blacknose mortality occurs as bycatch in the Gulf of Mexico shrimp trawl fishery based on average mortality between 1999 and 2005, and the rest of the mortality occurs within the South Atlantic

shrimp trawl fishery and the Atlantic commercial and recreational shark fisheries. Additional information on SCS and blacknose bycatch in the shrimp trawl fishery can be found in Chapter 3 in Section 3.10.4.1. However, since the Gulf of Mexico and South Atlantic Councils manage the shrimp trawl fisheries, NMFS is implementing measures in this amendment to reduce the landings and discards in only the Atlantic shark fisheries. NMFS will continue to work with the Gulf of Mexico and South Atlantic Fishery Management Councils to establish bycatch reduction methods, as appropriate, to reduce mortality in the shrimp trawl fisheries. Changes in the shrimp trawl fisheries in the South Atlantic and Gulf of Mexico regions would be done through the Council-process in those regions. NMFS will also work to reduce mortality of blacknose sharks in Atlantic shark fisheries through the implementation of management measures, as analyzed in this document.

Measures considered for blacknose sharks in this amendment include changes to the commercial SCS quota, changes to the authorized commercial gears, and changes to the recreational retention limits. Such measures are necessary to ensure that the rebuilding timeframe of 2027 is met for blacknose sharks with a 70 percent probability of success.

### **1.3.5 Smooth Dogfish**

In this final amendment NMFS prefers the alternative to add smooth dogfish under NMFS management, establish a commercial quota for this species, implement federal permitting requirements, and require fins remain naturally attached through landing. The implementation of the management measures in the preferred alternative will be delayed until the beginning of the fishing season in 2012. Any management measures implemented for smooth dogfish would also apply to Florida smoothhounds (*Mustelus norrisi*). Emerging molecular and morphological research has determined that Florida smoothhounds have been misclassified as a separate species from smooth dogfish (Jones, pers. comm.). Additionally, the SEFSC advised that there are insufficient data at this time to separate smooth dogfish and Florida smoothhound stocks, and that they should be treated as a single stock until scientific evidence indicates otherwise. Because of this taxonomic correction and based on SEFSC advice, Florida smoothhounds would be considered smooth dogfish and would fall under all smooth dogfish management measures, such as permit requirements and quotas.

NMFS currently manages sharks in four management units (small coastal sharks, pelagic sharks, large coastal sharks, and prohibited species). There are additional species of sharks that are HMS and that fall outside of the current management units. The management of these species remain under Secretarial authority should the Secretary determine the species is in need of conservation and management. One of these species, smooth dogfish, is not currently managed at the federal level. Although smooth dogfish were previously included in a fishery management unit (FMU) that included deepwater and other sharks in order to prevent finning, these species were removed from the FMU in the 2003 Amendment 1 to the Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks since they were protected from finning under the Shark Finning Prohibition Act (67 FR 6124, February 11, 2002). The Magnuson-Stevens Act is the primary statute giving fishery management authority to NMFS, on behalf of the Secretary of Commerce. The Magnuson-Stevens Act also provides authority for the Regional Fishery Management Councils to manage stocks and species within each Council's geographic jurisdiction due to the Council's close cooperation with constituents, fishery

experience and knowledge, and consensus building process. One exception to this management authority is for Atlantic HMS, which are managed solely under NMFS, on behalf of the Secretary of Commerce. As detailed below, NMFS has determined that smooth dogfish falls within the congressional directive regarding HMS and should be managed under the Secretary's authority.

The Magnuson-Stevens Act Section 3 (21) defines HMS. Unlike other HMS, sharks are not defined by family or species. Rather, the term "oceanic shark" is used. The statute does not further expound upon or define this term. Furthermore, NS3 requires that, to the extent practicable, an individual stock of fish should be managed throughout its range and Section 302 (3) states that the Secretary shall have authority over any HMS fishery that is within the geographical area of authority of more than one of the five Atlantic Councils. As described in Chapter 11, based on distribution maps provided in Compango (1984), smooth dogfish are found along the eastern seaboard of the United States from Massachusetts to Florida, in the Gulf of Mexico, and in the Caribbean Sea. Their distribution further extends outside the U.S. EEZ to the northern South American coast. Based on scientific surveys and recreational and commercial landings, NMFS has verified that smooth dogfish are found in each of the five Atlantic Regional Fishery Management Council regions. While the primary fishery occurs in the mid-Atlantic region, the species is currently caught in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea, and fishing effort on smooth dogfish could expand in these other regions. Given the wide distribution and range of smooth dogfish and the sections of the Magnuson-Stevens Act noted above, NMFS has determined that smooth dogfish is an oceanic shark, and therefore, because it meets the definition of HMS, the species should be managed by NMFS on behalf of the Secretary.

NMFS determined that conservation and management of smooth dogfish under the Magnuson-Stevens Act is warranted in order to collect data regarding the fishery, fishing effort, and life history of the species. First, a number of stakeholders have indicated that management of smooth dogfish is necessary. These include environmental organizations that have specifically requested management action, the ASMFC that included smooth dogfish in its management unit when finalizing its Interstate FMP for Coastal Sharks, and the MAFMC that specifically requested management authority to manage the smooth dogfish fishery. These efforts by the ASMFC and the MAFMC reinforced the request from environmental organizations that the fishery is in need of conservation and management.

Second, based on existing data, it is apparent that the smooth dogfish fishery is substantial and thus requires sound science-based conservation and management to provide for the long-term sustainable yield of the stock. The smooth dogfish fishery has significant annual landings with a large directed component. Even though landings of the species are likely underreported, the average annual landings of 431 mt dw is among the highest for any species of shark managed by NMFS, eclipsed by only sandbar and blacktip shark landings prior to implementation of Amendment 2. As is common in other elasmobranchs, smooth dogfish are slow to reproduce (see Chapter 11) and, therefore, could be vulnerable to stock collapse in the face of unrestricted fishing. NMFS needs to collect reliable data concerning the status of the stock to guide development of conservation and management measures, if necessary and appropriate, to meet the requirements of the Magnuson-Stevens Act.

Third, the vast majority of the smooth dogfish catch occurs with gillnets. Some gillnet fisheries in the Atlantic are defined as a Category I fisheries under the Marine Mammal Protection Act (MMPA), meaning the annual mortality and serious injury of one or more marine mammal stocks in a given fishery is greater than or equal to 50 percent of the Potential Biological Removal (PBR) level. While all fisheries need to comply with the requirements of the MMPA regardless of management status, it is easier to ensure the affected fishermen are engaged in the process if their fishery is consistently managed in accordance with uniform conservation and management measures developed and implemented through an FMP in accordance with the procedures in the Magnuson-Stevens Act.

Lastly, the smooth dogfish market could overlap with that of spiny dogfish, which is a species that is federally managed with a significant directed fishery. Spiny dogfish required restrictive management measures in the late 1990s and early 2000s to deal with domestic overfishing. While domestically spiny dogfish stocks appear to be healthy, other stocks internationally are overfished. Because of the possible overlap in markets, NMFS is concerned that smooth dogfish products can be used as a substitute for spiny dogfish products. If there is market overlap, then declines in spiny dogfish stocks (as is seen internationally) and restrictive management measures (including domestic management) could push, or might have already pushed, effort into the smooth dogfish fishery. Until initial management measures are in place to collect data concerning location, effort, and the status of the stock, NMFS will not be able to determine whether further prescriptive conservation and management through future FMP amendments and/or regulatory changes are necessary due to the influence of the foregoing and other relevant factors.

Because the stock has not been assessed, NMFS does not have the formal biological reference points to establish an OFL, ABC, or ACL for smooth dogfish. Therefore, under the preferred alternative, NMFS is using landings data to establish the landings component of the commercial sector ACL for smooth dogfish as required under NSG1 by 2011 for stocks not determined to be undergoing overfishing per the Magnuson-Stevens Act. Given the lack of a stock assessment, NMFS considered various ways of setting this quota, including reviewing the landings data available and any landings trends over recent years. NMFS believes that basing the landings component of the commercial sector ACL on recent landings is acceptable given the biological characteristics of the stocks or stock complex and given that it would serve as limit on catch and prevent overfishing. As needed, NMFS could adjust the landings component of the commercial sector ACL and add in a landings component for the recreational sector ACL. As outlined above for pelagic sharks, in the absence of a specific TAC, NMFS considers these quotas to be equivalent to the ACL, ABC, and TAC for smooth dogfish. As needed and required, NMFS can adjust these ACLs and apply AMs. More information on the alternatives considered to establish the quota can be found in Chapters 2 and 4 of this document.

### **1.3.6 2008 Stock Assessment for Shortfin Mako Sharks**

In 2008, an updated stock assessment of shortfin mako sharks was conducted by ICCAT's SCRS (SCRS 2008). The SCRS determined that while the quantity and quality of the data available for use in the stock assessment had improved since the 2004 assessment, the data were still uninformative and did not provide a consistent signal to inform the models used in the

2008 assessment. The SCRS noted that if these data issues could not be resolved in the future, their ability to determine stock status for these and other species would continue to be uncertain. The SCRS assessed shortfin mako sharks as three different stocks, North Atlantic, South Atlantic, and Mediterranean. However, the Mediterranean data was considered insufficient to conduct the quantitative assessments for these species.

For North Atlantic shortfin mako sharks, multiple model outcomes indicated stock depletion to be about 50 percent of virgin biomass (1950s levels) and levels of  $F$  above those resulting in  $MSY$ , whereas other models estimated considerably lower levels of depletion and no overfishing. The SCRS determined that there is a “non-negligible probability” that the North Atlantic shortfin mako stock could be below the biomass that could support  $MSY$  ( $B_{2007}/B_{msy} = 0.95-1.65$ ) and above the fishing mortality rate associated with  $MSY$  ( $F_{2007}/F_{msy} = 0.48-3.77$ ). Similar outcomes were determined by the SCRS from the 2004 assessment; however, recent biological data show decreased productivity for this species. Therefore, given the results of this assessment, NMFS has determined that the North Atlantic shortfin mako shark stock is not overfished, but is approaching an overfished status and is experiencing overfishing (June 19, 2009, 74 FR 29185).

Because shortfin mako sharks have been determined to not be overfished, NMFS is not implementing a rebuilding plan at this time. NMFS considered several alternatives to end overfishing of shortfin mako sharks. Those alternatives are described in Chapters 2 and 4.

## **1.4 Purpose and Need**

NMFS published updated determinations for the SCS shark species/complex that were assessed in conjunction with a Notice of Intent (May 7, 2008, 73 FR 25665) to prepare an EIS. The Agency published a separate notice that determined shortfin mako sharks are not overfished, but are approaching an overfished status and are experiencing overfishing (June 19, 2009, 74 FR 29185). An issues and options presentation was released on July 2, 2008, followed by five scoping hearings and a public comment period that closed on November 14, 2008. A Predraft document describing potential alternatives that might be included in the DEIS and proposed rule for Amendment 3 to the 2006 Consolidated HMS FMP was released to HMS consulting parties (which includes the HMS AP) on February 11, 2009, and presented to the HMS AP at the HMS AP meeting on February 19, 2009. The HMS AP and consulting parties submitted comments on the Predraft prior to March 16, 2009. The draft Amendment 3 and its proposed rule were released on July 24, 2009 (74 FR 36706 and 74 FR 36892). The comment period closed on September 25, 2009 and NMFS held numerous public hearings and consulted with the five Atlantic Regional Fishery Management Councils and the Atlantic States Marine Fisheries Commission.

### **1.4.1 Need**

As previously described, NMFS determined that blacknose sharks are overfished and blacknose sharks and shortfin mako sharks are experiencing overfishing, based on the results of the 2007 SCS stock assessment and 2008 ICCAT assessment for shortfin mako sharks. In addition, NMFS determined that smooth dogfish are in need of conservation and management. The Magnuson-Stevens Act also requires establishment of a mechanism in each FMP to specify

ACLs and develop AMs. For these reasons, NMFS has identified the following needs for this action to amend the HMS FMP:

- The Magnuson-Stevens Act requires each fishery to be managed to achieve OY while preventing overfishing. The North Atlantic shortfin mako shark stock is experiencing overfishing. NMFS needs to consider both domestic and international measures for ending the overfishing of the species;
- The Magnuson-Stevens Act requires NMFS to end overfishing and rebuild fisheries determined to be in an overfished condition. NMFS determined blacknose sharks are overfished and experiencing overfishing, and must amend the 2006 Consolidated HMS FMP to include management measures and propose corresponding implementing regulations to end overfishing and rebuild the fishery in the shortest time possible;
- The Magnuson-Stevens Act gives NMFS (on behalf of the Secretary) the authority to manage HMS, including oceanic sharks that are determined to be in need of conservation and management. NMFS has determined that smooth dogfish, an oceanic shark, are in need of conservation and management and, therefore, NMFS needs to amend the 2006 Consolidated HMS FMP and implement regulations to provide for its management.
- The Magnuson-Stevens Act requires FMPs to include a mechanism for specifying ACLs and AMs for all fisheries. ACLs and AMs must be effective for species or complexes subject to overfishing by 2010 and for all other species or complexes no later than 2011. The 2006 Consolidated HMS FMP and its amendments do not presently include such a mechanism or a practice of specifying annual ACLs. Therefore, the 2006 Consolidated HMS FMP needs to be amended to meet this requirement by the statutory deadline for species and complexes it manages. NMFS must also consider whether it needs to propose or amend implementing regulations to specify ACLs annually and apply AMs.

#### **1.4.2 Purpose and Objectives**

The actions considered in this amendment are intended to achieve the following purposes and objectives in a manner that minimizes, to the greatest extent possible, adverse economic impacts on affected fisheries. Consistent with the 2006 Consolidated HMS FMP objectives, the Magnuson-Stevens Act, and other relevant federal laws and the corresponding need set forth above, the specific purposes and objectives of this action are to:

- Implement a rebuilding plan for blacknose sharks to ensure that fishing mortality levels for blacknose sharks are maintained at or below levels that would result in a 70 percent probability of rebuilding in the timeframe recommended by the assessment;
- End overfishing of blacknose and shortfin mako sharks;
- Provide an opportunity for the sustainable harvest of finetooth, bonnethead, and Atlantic sharpnose sharks and other sharks, as appropriate;
- Prevent overfishing of Atlantic sharks, as appropriate;
- Consider smooth dogfish management measures for smooth dogfish sharks in federal waters, as appropriate; and

- Develop an appropriate mechanism for specifying ACLs to prevent and end overfishing, within the constraints of existing data, and annually set ACLs and apply AMs to ensure that ACLs are not exceeded.

## **1.5 Other Considerations**

### *Administrative amendments*

As described in the proposed rule released with the draft amendment, in addition to the management measures described in this document, NMFS is also considering some administrative actions to clarify, correct, and update the existing regulations at the following citations: clarifying §635.5 (b) regarding the reporting of fin weight and dressed weight separately on dealer reports; modifying language at §635.20 (e) to clarify that only one shark per vessel per trip can be taken along with one bonnethead and one Atlantic sharpnose shark per person per trip; propose to rename the closure “South Carolina A” as “Northern South Carolina” at §635.21 (d); proposing language at §635.27 (b) to allow the take of dusky sharks under EFPs, based on Agency’s discretion; removing the word “intact” at §635.30 (c) and clarifying that sharks cannot be cut up and used as bait on vessels issued a federal commercial shark permit; updating a reference from the previous Billfish and Tunas, Swordfish, and Shark FMPs to the current Consolidated HMS FMP at §635.32 (e); and updating the species names to match the most recent scientific naming determinations at Table 1 of Appendix A, in addition to adding smooth dogfish to this list. None of these administrative actions are expected to have any economic, social, or ecological impacts.

### *Circle Hooks*

The Agency compiled the results of several studies that examined the use of circle hooks in various bottom longline (BLL) fisheries. The results of these BLL studies were inconclusive regarding the impact of circle hooks on protected resources as well as target species caught in BLL fisheries. The efficacy of using circle hooks to reduce bycatch and post-hooking mortality of sea turtles is well-documented in other fisheries, including the HMS pelagic longline (PLL) fishery. Circle hooks are required for the Atlantic HMS PLL fishery consistent with the June 2004 Biological Opinion. The Agency is not proposing that circle hooks be required for BLL fisheries targeting shark at this time for several reasons: 1) lack of data demonstrating conservation benefits in BLL fisheries, 2) potential inconsistencies between Council-managed and HMS BLL fisheries that may occur as a result of requiring circle hooks, and 3) observer data indicating that circle hooks are already the most frequently used type of hook on trips targeting sharks in the South Atlantic and Gulf of Mexico regions. Because of this, NMFS did not implement any circle hook requirements in the BLL fishery under Amendment 2 to the Consolidated HMS FMP and is not considering circle hook requirements in the BLL fishery under this amendment. NMFS is unaware of any recent studies regarding circle hooks in the BLL fishery, but NMFS continues to monitor the effectiveness and bycatch associated with circle and J hooks through the shark BLL observer program both inside and outside of the Atlantic shark research fishery.

### *Catch Shares*

A catch share is the allocation of the available fishery quota among participants within the fishery. Limited Access Privilege Programs (LAPPs) are one type of catch share program. These programs may be implemented to address numerous issues, including but not limited to: ending the race for fish, reducing overcapitalization, and improving efficiency and safety, while still addressing the biological needs of a stock. These programs can be designed specifically to meet the needs of a fishery for which they are designed, provided they meet the requirements outlined in the Magnuson-Stevens Act. Catch shares were not considered for the shark fishery in this amendment because of the ramifications this type of program would have for the existing permit structure and the time required for implementing these programs.

NMFS continued to hear comments during the public comment period on the draft amendment and its proposed rule that fishermen both want and do not want NMFS to consider catch shares or similar programs such as individual fishing quotas in the shark fishery. To properly design a catch share program that appropriately considers the views and interests of all stakeholders and then implement such a system would take NMFS several years, therefore, catch shares were not considered a reasonable alternative for this action given the mandate in § 304(e) of the Magnuson-Stevens Act to have ACLs in place for stocks experiencing overfishing by 2010. However, NMFS is considering revisions to the existing permit structure within HMS fisheries. This could include a catch share program for sharks as well as other HMS as was discussed during the September/October 2008 HMS Advisory Panel. NMFS published an Advanced Notice of Proposed Rulemaking (ANPR) on June 1, 2009 (74 FR 26174), to initiate broad public participation in considering catch shares for HMS fisheries.

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## CHAPTER 2 TABLE OF CONTENTS

<b>Chapter 2 Table of Contents</b> .....	<b>2-i</b>
<b>Chapter 2 List of Tables</b> .....	<b>2-ii</b>
<b>Chapter 2 List of Figures</b> .....	<b>2-iii</b>
<b>2.0 Summary of the Alternatives</b> .....	<b>2-1</b>
2.1 Commercial Measures .....	2-3
2.1.1 SCS Commercial Quotas .....	2-3
2.1.2 Commercial Gear Restrictions.....	2-8
2.1.3 Pelagic Shark Effort Controls.....	2-9
2.2 Recreational Measures.....	2-11
2.2.1 Small Coastal Sharks .....	2-11
2.2.2 Pelagic Sharks.....	2-13
2.3 Smooth Dogfish .....	2-15
2.4 Alternatives Considered But Not Further Analyzed.....	2-21

## CHAPTER 2 LIST OF TABLES

Table 2.1	An overview of all the alternatives considered in draft Amendment 3 to the 2006 Consolidated HMS FMP.....	2-1
Table 2.2	Framework showing potential for quota changes for blacknose and non-blacknose SCS if fishermen are able to target specific species of sharks.....	2-7
Table 2.3	Framework showing potential for quota changes for blacknose and non-blacknose sharks if fishermen are not able to target specific species of sharks. ....	2-7
Table 2.4	Total Annual Landings by Year and Summary Data spanning 1998-2007.....	2-19

## CHAPTER 2 LIST OF FIGURES

Figure 2.1	Neonate blacknose shark interactions.....	2-23
Figure 2.2	Juvenile blacknose shark interactions.....	2-24
Figure 2.3	Neonate and juvenile blacknose interactions relative to the 20 fathom line.....	2-25
Figure 2.4	Observed BLL sets from 1994-2007 relative to the 20 fathom line. ....	2-26
Figure 2.5	Observed BLL sets from 1994-2007 relative to the 50 fathom line. ....	2-27



## 2.0 SUMMARY OF THE ALTERNATIVES

As described in Chapter 1, NMFS is considering various shark management measures to meet the objectives of the Magnuson-Stevens Act and the 2006 Consolidated HMS FMP based on the 2007 stock assessments for SCS, and the 2008 ICCAT pelagic shark stock assessment. The DEIS for Amendment 3 to the Consolidated HMS FMP was published on July 24, 2009 (74 FR 36891) and NMFS held nine public hearings. While some of the alternatives considered in the DEIS were modified in the final stage of Amendment 3 to the 2006 Consolidated HMS FMP, the overall list of issues to be addressed has not changed. This document includes a full range of reasonable alternatives designed to meet the purpose and need for action described in Chapter 1 and address public comments received during the DEIS stage. Table 2.1 gives an overview of all the alternatives considered and indicates changes to quotas and preferred alternatives from the DEIS to FEIS. The preferred alternatives in this document considered all of the comments received from the public during the draft stage. The environmental, economic, and social and socio-economic impacts of these alternatives are discussed in later chapters.

**Table 2.1 An overview of all the alternatives considered in draft Amendment 3 to the 2006 Consolidated HMS FMP**

Issue	Alternative	Alternative Description
SCS Commercial Quotas	Alternative A1	No Action. Maintain the existing SCS quota and species complex
	Alternative A2	Establish a new SCS quota of 221.6 mt dw and a blacknose quota of 12.1 mt dw *
	Alternative A3	Establish a new SCS quota of 110.8 mt dw and a blacknose quota of 19.9 mt dw; allow all current authorized gears for sharks*
	Alternative A4	Establish a new SCS quota of 55.4 mt dw and a blacknose quota of 15.9 mt dw; remove shark gillnet gear as an authorized gear for sharks *
	Alternative A5	Close the SCS fishery
	Alternative A6	<i>Establish a new SCS quota of 221.6 mt dw and a blacknose quota of 19.9 mt dw; allow all current authorized gears for sharks- Preferred Alternative **</i>
Commercial Gear Restrictions	Alternative B1	<i>No Action. Maintain current authorized gears for commercial shark fishing – Preferred Alternative **</i>
	Alternative B2	Close shark gillnet fishery; remove gillnet gear as an authorized gear type for commercial shark fishing
	Alternative B3	Close the gillnet fishery to commercial shark fishing from South Carolina south, including the Gulf of Mexico and the Caribbean Sea
Commercial Pelagic Shark Effort Controls	Alternative C1	No Action. Keep shortfin mako sharks in the pelagic shark species complex and maintain the quota
	Alternative C2	Remove shortfin mako sharks from pelagic shark species quota and establish a shortfin mako quota
	Alternative C3	Remove shortfin mako sharks from pelagic shark species complex and place this species on the prohibited shark species list
	Alternative C4	Establish a commercial size limit for shortfin mako sharks

<b>Issue</b>	<b>Alternative</b>	<b>Alternative Description</b>
	Alternative C4a	Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of female shortfin mako sharks reach sexual maturity or 32 inches interdorsal length (IDL)
	Alternative C4b	Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of male shortfin mako sharks reach sexual maturity or 22 inches IDL
	Alternative C5	<i>Take action at the international level to end overfishing of shortfin mako – Preferred Alternative</i>
	Alternative C6	<i>Promote the release of shortfin mako sharks brought to fishing vessels alive – Preferred Alternative</i>
Recreational Measures for SCS	Alternative D1	<i>No Action. Maintain the current recreational retention and size limits for SCS - Preferred Alternative **</i>
	Alternative D2	Modify the minimum recreational size limit for blacknose sharks based on their biology
	Alternative D3	Increase the retention limit for Atlantic sharpnose sharks based on current catches
	Alternative D4	Prohibit retention of blacknose sharks in recreational fisheries
Recreational Measures for Pelagic Sharks	Alternative E1	No Action. Maintain the current recreational retention and size limits for shortfin mako sharks
	Alternative E2	Increase the recreational minimum size limit of shortfin mako sharks
	Alternative E2a	Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of female shortfin mako sharks reach sexual maturity or 108 in FL
	Alternative E2b	Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of male shortfin mako sharks reach sexual maturity or 73 inches FL
	Alternative E3	<i>Take action at the international level to end overfishing of shortfin mako sharks– Preferred Alternative</i>
	Alternative E4	<i>Promote the release of shortfin mako sharks brought to fishing vessels alive – Preferred Alternative</i>
	Alternative E5	Prohibit retention of shortfin mako sharks in recreational fisheries (catch and release only)
Smooth Dogfish	Alternative F1	No Action. Do not add smooth dogfish under NMFS management
	Alternative F2	<i>Add smooth dogfish under NMFS Management and establish a federal permit requirement - Preferred Alternative</i>
	Alternative F2 a1	Establish a smooth dogfish quota that is equal to the average annual landings from 1998-2007 (431.1 mt dw)
	Alternative F2 a2	Establish a smooth dogfish quota equal to the maximum annual landings from 1998-2007 (576.1 mt dw)
	Alternative F2 a3	Establish a smooth dogfish quota equal to the maximum annual landings from 1998-2007 plus one standard deviation (645.8 mt dw)
	Alternative F2 a4	<i>Establish a smooth dogfish quota equal to the maximum annual landings from 1998-2007 plus two standard deviation (715.5 mt dw) – Preferred Alternative **</i>
	Alternative F2 b1	<i>Establish a separate smooth dogfish set-aside quota for the exempted fishing program– Preferred Alternative</i>
	Alternative F2 b2	Establish a smooth dogfish set-aside quota for the exempted fishing program and add it to the current 60 mt ww set-aside quota for the exempted fishing program

Issue	Alternative	Alternative Description
	Alternative F3	Add smooth dogfish under NMFS management and mirror management measures implemented in the ASMFC Interstate Shark FMP
Alternatives Considered But Not Further Analyzed	Alternative G1	Establish species-specific quotas for all species in the SCS complex based on average landings; close each quota individually, as needed
	Alternative G2	Establish new time/area closures in blacknose shark nursery areas for all HMS gears
	Alternative G3	Close waters inshore of 20 fathoms in the Gulf of Mexico to shark bottom longline gear
	Alternative G4	Close waters inshore of 50 fathoms in the Gulf of Mexico to shark bottom longline gear
	Alternative G5	Add deepwater sharks to the management unit and place these species on the prohibited list
	Alternative G6	Establish catch shares in the Atlantic shark fisheries
* Indicates changes in SCS and blacknose quota levels from DEIS to FEIS		
** Indicates changes in preferred alternatives from DEIS to FEIS		

## 2.1 Commercial Measures

### 2.1.1 SCS Commercial Quotas

The 2007 blacknose shark stock assessment estimated that blacknose sharks would have a 70 percent probability of rebuilding by 2027 with a TAC of 19,200 individuals per year. To achieve this TAC, NMFS would need to reduce overall blacknose mortality by at least 78 percent across all fisheries that interact with blacknose sharks. NMFS determined the number of blacknose sharks that could be taken in the Atlantic commercial shark fishery to achieve a 78 percent mortality reduction. The result is a commercial allowance of 7,094 blacknose sharks that could be taken (landed and discarded) within the Atlantic commercial shark fishery while still allowing the blacknose sharks to rebuild as outlined in Chapter 1. A description of the calculations used to calculate the quota allowed under each alternative is described in Appendix A

Alternative A1          No Action. Maintain the existing SCS quota and species complex

Under alternative A1, the No Action alternative, NMFS would maintain the existing commercial quota for SCS of 454 mt dw. This quota would be used to account for landings of any of the four species in the SCS complex: finetooth, Atlantic sharpnose, bonnethead, and blacknose sharks. Regulations regarding quota over and underharvests adjustments would not change under this alternative.

Alternative A2          Establish a new SCS quota of 221.6 mt dw and a blacknose commercial quota of 12.1 mt dw

As a result of updated data and public comment, the quotas under alternative A2 changed from the DEIS to FEIS stage. In the DEIS, alternative A2 would remove blacknose sharks from the SCS quota and created a blacknose shark-specific quota and a separate non-blacknose SCS quota. The non-blacknose SCS quota would apply to finetooth, Atlantic sharpnose, and bonnethead sharks. The current SCS quota is 454 mt

dw, and the average landings of blacknose sharks from 2004 – 2007 is 61.5 mt dw. Under this alternative in the DEIS, NMFS subtracted the average landings of blacknose sharks from the SCS quota to establish a new non-blacknose SCS quota of 392.5 mt dw ( $454 - 61.5 = 392.5$ ). NMFS then reduced the average landings of blacknose sharks by 78 percent to establish a blacknose quota of 13.5 mt dw ( $61.5 * .78 = 47.97 - 61.5 = 13.5$ ).

In the FEIS, based in part on updated data (see Appendix A), NMFS revised the quotas in alternative A2. The revised alternative A2 would still establish a non-blacknose SCS quota for finetooth, Atlantic sharpnose, and bonnethead sharks. However, rather than subtracting the average blacknose shark landings from the SCS quota, as proposed in the DEIS, the revised non-blacknose SCS quota would be based on the average landings of finetooth, Atlantic sharpnose, and bonnethead sharks from 2004 – 2008, 221.6 mt dw. This change in approach is due, in part, to be consistent with the 2007 SCS stock assessment that indicated that, while none of those three species are currently overfished, or undergoing overfishing, fishing mortality should not be increased. With regards to blacknose sharks, the quota under alternative A2 in the DEIS was based on average landings from 2004 – 2007. The revised blacknose quota was calculated as it was in the DEIS but is based on the average landings of blacknose sharks of 55 mt dw from 2004-2008. Therefore, the revised blacknose quota under alternative A2 would be a 78-percent reduction of 55 mt dw, or 12.1 mt dw ( $55 * .78 = 42.9 - 55 = 12.1$ ).

Alternative A3            Establish a new SCS quota of 110.8 mt dw and a blacknose commercial quota of 19.9 mt dw; allow all current authorized gears for sharks

Similar to alternative A2, as a result of updated data and public comment, the quotas under alternative A3 changed from the DEIS to FEIS stage. In the DEIS, alternative A3 removed blacknose sharks from the SCS quota and created a blacknose shark-specific quota and a separate non-blacknose SCS quota. In the DEIS, the non-blacknose SCS quota would have been 42.7 mt dw, an 82 percent reduction from the average landings of finetooth, Atlantic sharpnose, and bonnethead sharks from 2004 – 2007. The blacknose shark quota would have been 16.6 mt dw, which was the amount of blacknose sharks that would have been harvested while the non-blacknose SCS quota was harvested. In addition, fishermen with an incidental LAP would have been prohibited from retaining blacknose sharks.

Based on updated data and public comment (see Appendix A), alternative A3 has been revised. The analyses used to calculate these revised quotas are essentially the same as those used in the DEIS. The changes are mainly due to revised average weight data, particularly for the gillnet fishery, and public comment that resulted in analyses indicating that gillnet fishermen appear to be able to target and avoid certain species of sharks. Therefore, the revised alternative A3 would set the non-blacknose SCS quota at 110.8 mt dw, which is a 50 percent reduction of the average landings of 221.6 mt dw from 2004-2008 for finetooth, Atlantic sharpnose, and bonnethead sharks. The revised blacknose shark quota would be 19.9 mt dw, which is the amount of blacknose sharks that would be harvested while the non-blacknose SCS quota is harvested. The revised alternative A3

would also allow fishermen with incidental permits to retain blacknose sharks when the fishing season is open.

Under alternative A3 it is assumed that fishermen with a directed shark LAP would fish for non-blacknose SCS in a directed fashion until the non-blacknose SCS quota and/or blacknose quota reaches 80 percent. At that time, both the non-blacknose SCS fishery and the blacknose shark fisheries would close. As described in Appendix A, NMFS determined that reducing the overall quota for the non-blacknose SCS fishery by 50 percent would reduce the level of blacknose shark discards such that the total blacknose shark mortality would stay below the allowance for the commercial fisheries

Alternative A4            Establish a new SCS quota of 55.4 mt dw and a blacknose commercial quota of 15.9 mt dw; remove shark gillnet gear as an authorized gear for sharks

Similar to alternatives A2 and A3, as a result of updated data and public comment, the quotas in alternative A4, the preferred alternative in the DEIS, changed from the DEIS to the FEIS stage. In the DEIS, alternative A4 removed blacknose sharks from the SCS quota and created a blacknose shark-specific quota and a separate non-blacknose SCS quota. In the DEIS, alternative A4 would have set the non-blacknose SCS quota at 56.9 mt dw. This quota was a 76 percent reduction from the average landings of finetooth, Atlantic sharpnose, and bonnethead sharks from 2004 through 2007. Also, NMFS would have established a blacknose-specific quota of 14.9 mt dw, which was the amount of blacknose sharks that would have been harvested while the non-blacknose SCS quota was harvested. Under alternative A4 in the DEIS gillnet gear would have been prohibited and fishermen with incidental LAPs would not have been authorized to retain blacknose sharks.

Based on updated data and public comment alternative A4 has been revised and is no longer the preferred alternative. The revised quota under alternative A4 would establish the non-blacknose SCS quota at 55.4 mt dw, which is a 75 percent reduction from the current landings of finetooth, Atlantic sharpnose, and bonnethead sharks from 2004 through 2008. A separate blacknose-specific quota would be set at 15.9 mt dw, which is the amount of blacknose sharks that would be harvested while the non-blacknose SCS quota of 55.4 mt dw is harvested. Gillnets would still be prohibited as an authorized gear in the SCS fishery under revised alternative A4. Fishermen with an incidental LAP would not be authorized to retain any blacknose sharks.

In addition, this alternative assumes that gillnet gear would not be used to harvest sharks under either alternative B2 or B3, and that fishermen would fish for SCS in a directed fashion until the non-blacknose SCS quota and/or blacknose quota reached 80 percent. At that time, both the non-blacknose SCS fishery and the blacknose shark fisheries would close

Alternative A5            Close the SCS fishery

Alternative A5 would close the SCS fishery in the Atlantic, Gulf of Mexico, and Caribbean for all fishermen until reopening was warranted based on new stock

assessments. Shark landings would be limited to pelagic sharks, non-sandbar LCS, sandbar sharks within the shark research fishery, and research and collection for public display within the HMS Exempted Fishing Permit Program. Also, shark landings would include smooth dogfish under alternative F2a4.

*Alternative A6            Establish a new SCS quota of 221.6 mt dw and a blacknose commercial quota of 19.9 mt dw; allow all current authorized gears for sharks – Preferred Alternative*

Alternative A6 is a new alternative that was added after the DEIS stage and is based on updated data, public comment, and additional analyses. NMFS believes that this new preferred alternative better reflects the intent of the previous preferred alternative, and remains within the range of considered alternatives. Alternative A6 combines alternatives A2 and A3. As described above in alternative A3, NMFS received public comment that gillnet fishermen could target and avoid certain species of sharks. Subsequent analyses of gillnet observer data indicates that this is a possibility. In addition to the gillnet observer data, NMFS also analyzed updated data on blacknose shark mortality rates and average sizes. Using this new information NMFS determined that under the revised alternative A3, as described above, 19.9 mt dw of blacknose sharks would be harvested when fishing for 110.8 mt dw of non-blacknose SCS. While NMFS assumes this ratio would continue, alternative A6 would give fishermen the opportunity to refine their techniques to target only non-blacknose SCS and would set the non-blacknose SCS quota equal to the average landings of non-blacknose SCS from 2004 through 2008. Therefore under alternative A6, the non-blacknose SCS quota would be set at 221.6 mt dw and the blacknose quota would be set at 19.9 mt dw. Also, under alternative A6 both the blacknose shark and non-blacknose SCS fisheries would close if either the blacknose or non-blacknose SCS quotas reach, or are projected to reach, 80 percent. Under alternative A6 all currently authorized commercial gears for sharks would be allowed.

Alternative A6 would be implemented in a framework mechanism that would give NMFS the flexibility to increase or decrease either the blacknose or non-blacknose SCS quotas based on the ability of fishermen to avoid blacknose sharks and target non-blacknose SCS, and/or any subsequent change in status based on new stock assessments of these species of sharks. For example, if fishermen were not able to avoid blacknose sharks, as demonstrated by continually filling the blacknose shark quota before the non-blacknose SCS quota, NMFS would reduce the non-blacknose SCS quota accordingly rather than accounting for underharvests of the non-blacknose SCS quota. Alternatively, if new stock assessments indicate that blacknose sharks are no longer overfished, the blacknose shark quota could be increased slightly pending new regulations based on the new stock assessment results. The basic framework is as follows.

*If gillnet fishermen were able to avoid and/or target certain species of sharks (as indicated by fishermen landing a ratio of at least 20 mt dw blacknose to 110 mt dw non-blacknose sharks):*

- If blacknose status improves, NMFS would increase the blacknose quota as appropriate and maintain non-blacknose SCS quota;

- If non-blacknose SCS status improves, NMFS would increase the non-blacknose SCS quota as appropriate and maintain blacknose quota;
- If blacknose status decreases, NMFS would reduce the blacknose quota as appropriate and maintain non-blacknose SCS quota; and
- If non-blacknose SCS status decreases, NMFS would reduce the non-blacknose SCS quota as appropriate and maintain blacknose quota.

**Table 2.2 Framework showing potential for quota changes for blacknose and non-blacknose SCS if fishermen are able to target specific species of sharks.**

Note: + = an increase in quota, 0 = status quo, - = a decrease in quota

Stock Status		Non-blacknose SCS: Improves	Non-blacknose SCS: Status quo	Non-Blacknose: Decreases
<b>Blacknose: improves</b>	Blacknose	+	+	+
	Non-blacknose SCS	+	0	-
<b>Blacknose: Status quo</b>	Blacknose	0	0	0
	Non-blacknose SCS	+	0	-
<b>Blacknose: Decreases</b>	Blacknose	-	-	-
	Non-blacknose SCS	+	0	-

*If gillnet fishermen were not able to avoid and/or target certain species of sharks (as indicated by fishermen landing a greater percentage of non-blacknose SCS compared to the ratio of 20 mt dw blacknose to 110 mt dw non-blacknose SCS):*

- If blacknose stock status improves, NMFS would increase the blacknose quota and maintain non-blacknose SCS quota, as appropriate;
- If non-blacknose SCS stock status improves, NMFS would maintain both quotas, pending stock assessments and resulting regulations;
- If blacknose status decreases, NMFS would reduce both the blacknose and non-blacknose SCS quota as appropriate; and
- If non-blacknose SCS stock status decreases, NMFS would reduce the non-blacknose quota as appropriate and maintain blacknose quota.

**Table 2.3 Framework showing potential for quota changes for blacknose and non-blacknose sharks if fishermen are not able to target specific species of sharks.**

Note: + = an increase in quota, 0 = status quo, - = a decrease in quota.

Stock Status		Non-blacknose SCS: Improves	Non-blacknose SCS: Status quo	Non-Blacknose: Decreases
<b>Blacknose: improves</b>	Blacknose	+	+	0
	Non-blacknose SCS	+	0	-
<b>Blacknose: Status quo</b>	Blacknose	0	0	0

Stock Status		Non-blacknose SCS: Improves	Non-blacknose SCS: Status quo	Non-Blacknose: Decreases
	Non-blacknose SCS	0	0	-
<b>Blacknose: Decreases</b>	Blacknose	-	-	-
	Non-blacknose SCS	-	-	-

### 2.1.2 Commercial Gear Restrictions

*Alternative B1*            *No Action. Maintain current authorized gears for commercial shark fishing – Preferred Alternative*

Under alternative B1, NMFS would maintain the current authorized gears for the commercial shark fishery in all regions where they are currently authorized. These gears are BLL, PLL, gillnet, rod and reel, handline, and bandit gear. This alternative would also maintain all the restrictions for the various gear types. For example, BLL vessels must carry corrodible hooks and the required safe handling, release and disentanglement equipment, and the sea turtle technical memorandum. In the shark gillnet fishery, gillnets must be less than 2.5 km and must remain attached to at least one vessel at one end. Net checks must be performed every 0.5 to 2 hours to look for and remove any entangled protected species. There are additional gillnet gear deployment restrictions for the southeast U.S. shark gillnet fishery in order to comply with various Take Reduction Plans (50 CFR part 229) consistent with the Marine Mammal Protection Act (MMPA). Requirements for smooth dogfish fishermen using gillnet gear are described in alternative F2. As described above in alternatives A2, A3, A4, and A6, based on revised data, public comments, and analyses, NMFS found that it may be feasible that gillnet fishermen can target certain species and avoid other species. As such, given the preferred alternative A6 above, NMFS now prefers this alternative

*Alternative B2*            *Close shark gillnet fishery; remove gillnet gear as an authorized gear type for commercial shark fishing*

Under alternative B2, NMFS would remove gillnet gear as an authorized gear type for commercial shark fishing. As such, this alternative would close the shark gillnet fishery in the Atlantic, Gulf of Mexico, and Caribbean. NMFS is considering this alternative because gillnet gear, and in particular, drift gillnet gear, is the predominant gear used to fish for the blacknose sharks in the South Atlantic region and removing this gear could result in large reductions in blacknose shark fishing mortality. This alternative would allow shark directed and incidental permit holders to continue to use other commercially authorized gears, such as BLL, rod and reel, handline or bandit gear, to harvest sharks.

Alternative B3            Close the gillnet fishery to commercial shark fishing from South Carolina south, including the Gulf of Mexico and the Caribbean Sea

Under alternative B3, NMFS would close the gillnet fishery to commercial shark fishing from South Carolina south, including the Gulf of Mexico and Caribbean Sea. This alternative would eliminate the predominant gear type used to harvest blacknose sharks in the South Atlantic region, and would help rebuild the blacknose shark stock by reducing gillnet mortality throughout their habitat range. Blacknose sharks are commonly found from North Carolina to Brazil, including the Gulf of Mexico and Caribbean Sea. This alternative would also help mitigate impacts of adding the smooth dogfish fishery under federal management (see alternatives F2 and F3), which uses gillnet gear predominately from North Carolina north. Under this alternative, NMFS would allow directed and incidental permit holders to use other authorized gear types besides gillnets to target sharks in the commercial shark fishery from South Carolina south. NMFS preferred this alternative in the DEIS, in part, to reduce blacknose mortality. However, as described above in alternatives A2, A3, A4, and A6, based on revised data, public comments, and analyses, NMFS found that there is a chance that gillnet fishermen can target certain species and avoid other species. As such, given the preferred alternative A6 above, NMFS no longer prefers this alternative.

### **2.1.3 Pelagic Shark Effort Controls**

Alternative C1            No Action. Keep shortfin mako sharks in the pelagic shark species complex and maintain the quota.

Under alternative C1, the No Action alternative, NMFS would maintain the current commercial shark fishing regulations that pertain to shortfin mako sharks established in the 2006 Consolidated HMS FMP. Shortfin mako sharks would remain in the pelagic shark species complex, which includes blue, common thresher, oceanic whitetip, and porbeagle sharks. The quota for pelagic sharks would remain the same, with 488 mt dw allocated for common thresher, oceanic whitetip, and shortfin mako sharks, 273 mt dw allocated for blue sharks, and 1.7 mt dw allocated for porbeagle sharks. Regulations regarding overharvest and underharvest of pelagic shark quota, and retention limits for pelagic sharks would remain the same.

Alternative C2            Remove shortfin mako sharks from pelagic shark species quota and establish a shortfin mako quota

Alternative C2 would remove shortfin mako sharks from the pelagic shark quota and would establish a species-specific quota for shortfin mako sharks based on current landings. Currently, the annual quota for common thresher, oceanic whitetip, and shortfin mako is 488 mt dw. Based on the average commercial landings of shortfin mako sharks from 2004-2007, the species-specific quota for shortfin mako sharks would be 72.5 mt dw (NMFS, 2008). The common thresher and oceanic whitetip sharks would be allocated a quota of 415.5 mt dw after removal of the shortfin mako quota of 72.5 mt dw (488 mt dw – 72.5 mt dw = 415.5 mt dw). The quotas for blue and porbeagle sharks would not change under this alternative and would be 273 mt dw and 1.7 mt dw, respectively. Regulations

regarding overharvest and underharvest of pelagic shark quota, and retention limits for pelagic sharks would remain the same.

Alternative C3            Remove shortfin mako sharks from pelagic shark species complex and place this species on the prohibited shark species list

Alternative C3 would remove shortfin mako sharks from the pelagic shark species complex and add them to the prohibited species list. Under the regulations, shark species can be added to the prohibited species list if two of the following four criteria are met: 1) There is sufficient biological information to indicate the stock warrants protection, such as indications of depletion or low reproductive potential or the species is on the ESA candidate list; 2) the species is rarely encountered or observed caught in HMS fisheries; 3) the species is not commonly encountered or observed caught as bycatch in fishing operations; or 4) the species is difficult to distinguish from other prohibited species (*i.e.*, look-alike issue). Adding shortfin mako sharks to the prohibited species list would make it illegal to retain or land shortfin mako shark commercially or recreationally. If the shortfin mako shark is placed on the prohibited species list, the average annual landings of shortfin mako sharks from 2004-2007 (72.5 mt dw) would be subtracted from the current annual quota for the pelagic shark quota group (488 mt dw), creating a quota of 415.5 mt dw for common thresher and oceanic whitetip sharks. Regulations regarding overharvest and underharvest of pelagic shark quota, and retention limits for pelagic sharks would remain the same.

Alternative C4            Establish a commercial size limit for shortfin mako sharks

Alternative C4a)        Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of female shortfin mako sharks reach sexual maturity or 32 inches interdorsal length (IDL)

Currently, there are no minimum size limits for sharks caught in the commercial fishery. Under alternative C4a, a commercial minimum size limit would be established for shortfin mako sharks to correspond with the size at which 50 percent of female shortfin mako sharks reach sexual maturity, calculated from Natanson *et al.* (2006) as 32 inches IDL, which is the straight line measurement from the base of the trailing edge of the first dorsal fin to the base of the leading edge of the second dorsal fin. Shortfin mako sharks less than 32 inches IDL could not be retained and would have to be discarded. Shortfin mako sharks greater than the 32 inch IDL size limit would be able to be retained and all landings would be counted against the appropriate quota for common thresher, oceanic whitetip, and shortfin mako sharks.

Alternative C4b)        Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of male shortfin mako sharks reach sexual maturity or 22 inches IDL

Under alternative C4b, a commercial minimum size limit would be established for shortfin mako sharks to correspond with the size at which 50 percent of male shortfin

mako sharks reach sexual maturity, calculated from Natanson *et al.* (2006) as 22 inches IDL. Currently, there are no minimum size limits for sharks caught in the commercial fishery. Shortfin mako sharks less than 22 inches IDL would be prohibited and could not be retained. All shortfin mako sharks greater than the 22 inch IDL limit would be available for commercial harvest and all landings would be counted against the appropriate quota.

*Alternative C5            Take action at the international level to end overfishing of shortfin mako sharks – Preferred Alternative*

Under alternative C5, NMFS would take action at an international level through international fishery management organizations to end overfishing of shortfin mako sharks. This plan would encompass the commercial fishery. ICCAT assumes there are three shortfin mako shark stocks for assessment purposes: northern and southern Atlantic stocks, separated at 5°N latitude and a Mediterranean stock. Based on the 2008 SCRS stock assessment on the North Atlantic shortfin mako population, NMFS independently determined that the North Atlantic stock of shortfin mako sharks is experiencing overfishing and approaching an overfished status. Any international measures adopted to end overfishing of the North Atlantic shortfin mako shark stock would be implemented domestically.

*Alternative C6            Promote the release of shortfin mako sharks brought to fishing vessels alive – Preferred Alternative*

Under this alternative, NMFS would actively engage in an outreach program with commercial fishermen and request that they release all shortfin mako sharks that come to the vessel alive in order to help prevent the shortfin mako shark population from becoming overfished. This action would not restrict commercial harvest of shortfin mako sharks that are alive at haulback, and quotas and retention limits would remain as described in the No Action alternative, alternative C1.

## **2.2 Recreational Measures**

### **2.2.1 Small Coastal Sharks**

*Alternative D1            No Action. Maintain the current recreational retention and size limit for SCS – Preferred Alternative*

In the DEIS, the preferred alternative was alternative D4, which would prohibit retention of blacknose shark in the recreational fishery. During the public comment period, NMFS received comments that if NMFS selected alternative D4, that some States would likely have to prohibit the retention of blacknose sharks in state waters. The comment stated that because some states have a well managed recreational fishery and conservation measures in place to adequately protect this species, prohibiting their retention was not necessary. Most blacknose sharks do not reach the current federal minimum size of 54 inches FL, therefore, it is presumed that most recreational blacknose shark landings currently occur in state waters, where size and retention limits for blacknose sharks may be less restrictive than federal regulations. In the Atlantic Ocean, under the

ASMFC Interstate Coastal Shark FMP there is currently no minimum size limits for blacknose sharks. Because the minimum size limit of 54 inches fork length (FL), acts as a de facto retention prohibition, and after evaluating public comments on the DEIS, NMFS decided to change the preferred alternative in the FEIS to alternative D1. However, NMFS would ask states to implement measures consistent with the current federal 54 inch FL size limit to help reduce recreational mortality in state waters and meet rebuilding targets for blacknose sharks. Depending on the results of the upcoming blacknose shark stock assessment, NMFS may consider prohibiting recreational retention of blacknose sharks in future actions.

Under the preferred alternative D1, NMFS would maintain the existing recreational retention limits for SCS. Recreational anglers are currently allowed one authorized shark species with a fork length (FL) greater than 54 inches, which includes SCS, per vessel per trip. Recreational fishermen are also able to retain one bonnethead shark and one Atlantic sharpnose shark per person per trip. There is no minimum size requirement for bonnethead and Atlantic sharpnose sharks.

Alternative D2            Modify the minimum recreational size limit for blacknose sharks based on their biology

Under alternative D2, NMFS would modify the minimum recreational size for blacknose sharks based on their reproductive biology. The current minimum retention size is 54 inches and is based on the reproductive biology of the sandbar shark. However, most blacknose sharks do not reach a maximum size of 54 inches FL. Under alternative D2, NMFS would reduce the minimum size limit for blacknose sharks to a minimum size of 36 inches FL, which is the size at which 50 percent of the female blacknose sharks reach sexual maturity.

Alternative D3            Increase the retention limit for Atlantic sharpnose sharks based on current catches

Under alternative D3, NMFS would increase the retention limit for Atlantic sharpnose sharks based on recent catch history and current stock status. Under current federal regulations, recreational anglers are allowed to retain one Atlantic sharpnose shark per person per trip. Under alternative D3, NMFS would consider increasing this retention limit based on the stock status of the species and current catches.

Alternative D4            Prohibit retention of blacknose sharks in recreational fisheries

Under alternative D4, NMFS would prohibit the retention of blacknose sharks in the recreational fishery. While recreational fishermen may still catch blacknose sharks when fishing for other species, they would not be permitted to retain blacknose sharks and would have to release them. Because most blacknose sharks do not reach the current federal minimum size of 54 inches FL, it is presumed that most recreational blacknose shark landings currently occur in state waters, where size and retention limits for blacknose sharks may be less restrictive than federal regulations. Complementary measures in state waters would be important for reducing mortality of blacknose shark in recreational

fisheries and ensuring the rebuilding plan is met for blacknose sharks. In the DEIS, this was the preferred alternative. However, because the *status quo* minimum size limit of 54 inches acts as a *de facto* retention prohibition and after evaluating public comments on the DEIS, NMFS decided to change the preferred alternative in the FEIS to alternative D1.

### 2.2.2 Pelagic Sharks

Alternative E1            No Action. Maintain the current recreational retention and size limits for shortfin mako sharks.

Under the No Action alternative, NMFS would maintain the current recreational retention and size limits for shortfin mako sharks. Shortfin mako sharks would remain in the pelagic shark species complex, which includes blue, common thresher, oceanic whitetip, and porbeagle sharks. Recreational fishermen would continue to be limited to one authorized shark species, which include shortfin mako sharks, greater than 54 inches FL per vessel per trip, and one Atlantic sharpnose and one bonnethead shark per person per trip with no minimum size.

Alternative E2            Increase the recreational minimum size limit of shortfin mako

Alternative E2a)        Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of female shortfin mako sharks reach sexual maturity or 108 inches FL

Under Alternative E2a, NMFS would increase the recreational minimum size limit for shortfin mako sharks to correspond with the size at which 50 percent of female shortfin mako sharks reach sexual maturity, identified in Natanson *et al.* (2006) as 108 inches FL. Currently, the minimum size limit for all pelagic sharks caught in the recreational fishery is 54 inches FL. Under this alternative, the shortfin mako shark recreational minimum size would be increased to 108 inches FL to help end overfishing of the stock. Shortfin mako sharks below this minimum size limit would be prohibited and could not be retained. Under this alternative, all shortfin mako sharks greater than the 108 inch FL minimum size limit would be authorized for retention. The 108 inch FL measurement is equivalent to the 32 inch IDL measurement used for implementing a commercial size limit in Alternative C4a, but the different measurements are used to accommodate the different fisheries. Recreational anglers would be limited to one shark greater than 54 inches FL or one shortfin mako greater than 108 inches FL per vessel per trip, and one Atlantic sharpnose and one bonnethead shark per person per trip.

Alternative E2b)        Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of male shortfin mako sharks reach sexual maturity or 73 inches FL

The recreational minimum size limit would be increased for shortfin mako sharks under Alternative E2b to correspond with the size at which 50 percent of male shortfin mako sharks reach sexual maturity, identified in Natanson *et al.* (2006) as 73 inches FL. Currently, the minimum size limits for all pelagic sharks caught in the recreational fishery is 54 inches FL. The shortfin mako shark recreational minimum size would be increased to

73 inches FL to help end overfishing of the stock. Shortfin mako sharks caught below this size limit would be prohibited and could not be retained. The 73 inch FL measurement is equivalent to the 22 inch IDL measurement used for implementing a commercial size limit in Alternative C4b, but the different measurements are used to accommodate the different fisheries. All shortfin mako sharks greater than 73 inches FL and all other pelagic sharks greater than 54 inches FL limit would be available for recreational harvest. Recreational anglers would be limited to one shark greater than 54 inches FL or one shortfin mako greater than 73 inches FL per vessel per trip, and one Atlantic sharpnose and one bonnethead shark per person per trip.

*Alternative E3            Take action at the international level to end overfishing of shortfin mako sharks – Preferred Alternative*

Under alternative E3, NMFS would take action at an international level through international fishery management organizations to end overfishing of shortfin mako sharks. As discussed under alternative C5, ICCAT assumes there are three shortfin mako shark stocks for assessment purposes: northern and southern Atlantic stocks, separated at 5°N latitude and a Mediterranean stock. Any international measures adopted to end overfishing of the North Atlantic shortfin mako shark stock would be implemented domestically.

*Alternative E4            Promote the release of shortfin mako sharks brought to fishing vessels alive – Preferred Alternative*

The promotion of the live release of shortfin mako sharks in the recreational shark fishery, as considered in alternative C6, would not result in any changes to the current recreational regulations regarding shortfin mako sharks. Under this alternative, NMFS would actively engage in an outreach program with recreational fishermen and request that they release all shortfin mako sharks that come to the boat alive in order to help prevent the North Atlantic shortfin mako shark population from becoming overfished. This action does not restrict recreational harvest of shortfin mako sharks that are alive at haulback, and bag limits would remain as described in the No Action alternative, alternative E1.

*Alternative E5            Prohibit retention of shortfin mako sharks in recreational fisheries (catch and release only)*

Under alternative E5, NMFS would prohibit the retention of shortfin mako sharks in the recreational fishery by placing it on the prohibited species list. Under the regulations, shark species can be added to the prohibited species list if two of the following four criteria are met: 1) There is sufficient biological information to indicate the stock warrants protection, such as indications of depletion or low reproductive potential or the species is on the ESA candidate list; 2) the species is rarely encountered or observed caught in HMS fisheries; 3) the species is not commonly encountered or observed caught as bycatch in fishing operations; or 4) the species is difficult to distinguish from other prohibited species (*i.e.*, look-alike issue). Adding shortfin mako sharks to the prohibited species list would make it illegal to land shortfin mako sharks recreationally or commercially and recreational fishermen would only be authorized to catch and release shortfin mako sharks.

### 2.3 Smooth Dogfish

NMFS currently manages sharks in four management units (small coastal sharks, pelagic sharks, large coastal sharks, and prohibited species). There are additional species of sharks that are HMS and that fall outside of the current management units. The management of these species remain under Secretarial authority should the Secretary determine the species is in need of conservation and management. One of these species, smooth dogfish, is not currently managed at the federal level. Although smooth dogfish were previously included in a fishery management unit (FMU) that included deepwater and other sharks in order to prevent finning, these species were removed from the FMU in the 2003 Amendment 1 to the Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks since they were protected from finning under the Shark Finning Prohibition Act (67 FR 6124, February 11, 2002). The Magnuson-Stevens Act is the primary statute giving fishery management authority to NMFS, on behalf of the Secretary of Commerce. The Magnuson-Stevens Act also provides authority for the Regional Fishery Management Councils to manage stocks and species within each Council's geographic jurisdiction due to the Council's close cooperation with constituents, fishery experience and knowledge, and consensus building process. One exception to this management authority is for Atlantic HMS, which are managed solely under NMFS, on behalf of the Secretary of Commerce. As detailed below, NMFS has determined that smooth dogfish falls within the congressional directive regarding HMS and should be managed under the Secretary's authority.

Before and during the public comment period for the DEIS and the proposed rule, NMFS received several suggestions that the management of smooth dogfish should be given to the Regional Fishery Management Councils. NMFS disagrees (see Appendix C). The Magnuson-Stevens Act Section 3 (21) defines HMS. Unlike other HMS, sharks are not defined by family or species. Rather, the term "oceanic shark" is used. The statute does not further expound upon or define this term. Furthermore, NS3 requires that, to the extent practicable, an individual stock of fish should be managed throughout its range and Section 302 (3) states that the Secretary shall have authority over any HMS fishery that is within the geographical area of authority of more than one of the five Atlantic Councils. As described in Chapter 11, based on distribution maps provided in Compango (1984), smooth dogfish are found along the eastern seaboard of the United States from Massachusetts to Florida, in the Gulf of Mexico, and in the Caribbean Sea. Their distribution further extends outside the U.S. EEZ to the northern South American coast. Based on scientific surveys and recreational and commercial landings, NMFS has verified that smooth dogfish are found in each of the five Atlantic Regional Fishery Management Council regions. While the primary fishery occurs in the mid-Atlantic region, the species is currently caught in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea, and fishing effort on smooth dogfish could expand in these other regions. Given the wide distribution and range of smooth dogfish and the sections of the Magnuson-Stevens Act noted above, NMFS has determined that smooth dogfish is an oceanic shark, and therefore, because it meets the definition of HMS, the species should be managed by NMFS on behalf of the Secretary.

NMFS determined that conservation and management of smooth dogfish under the Magnuson-Stevens Act is warranted in order to collect data regarding the fishery, fishing effort, and life history of the species. First, a number of stakeholders have indicated that management of smooth dogfish is necessary. These include environmental organizations that have specifically requested management action, the ASMFC that included smooth dogfish in its management unit when finalizing its Interstate FMP for Coastal Sharks, and the MAFMC that specifically requested management authority to manage the smooth dogfish fishery. These efforts by the ASMFC and the MAFMC reinforced the request from environmental organizations that the fishery is in need of conservation and management.

Second, based on existing data, it is apparent that the smooth dogfish fishery is substantial and thus requires sound science-based conservation and management to provide for the long-term sustainable yield of the stock. The smooth dogfish fishery has significant annual landings with a large directed component. Even though landings of the species are likely underreported, the average annual landings of 431 mt dw is among the highest for any species of shark managed by NMFS, eclipsed by only sandbar and blacktip shark landings prior to implementation of Amendment 2. As is common in other elasmobranchs, smooth dogfish are slow to reproduce (see Chapter 11) and, therefore, could be vulnerable to stock collapse in the face of unrestricted fishing. NMFS needs to collect reliable data concerning the status of the stock to guide development of conservation and management measures, if necessary and appropriate, to meet the requirements of the Magnuson-Stevens Act.

Third, the vast majority of the smooth dogfish catch occurs with gillnets. Some gillnet fisheries in the Atlantic are defined as a Category I fisheries under the Marine Mammal Protection Act (MMPA), meaning the annual mortality and serious injury of one or more marine mammal stocks in a given fishery is greater than or equal to 50 percent of the Potential Biological Removal (PBR) level. While all fisheries need to comply with the requirements of the MMPA regardless of management status, it is easier to ensure the affected fishermen are engaged in the process if their fishery is consistently managed in accordance with uniform conservation and management measures developed and implemented through an FMP in accordance with the procedures in the Magnuson-Stevens Act.

Lastly, the smooth dogfish market could overlap with that of spiny dogfish, which is a species that is federally managed with a significant directed fishery. Spiny dogfish required restrictive management measures in the late 1990s and early 2000s to deal with domestic overfishing. While domestically spiny dogfish stocks appear to be healthy, other stocks internationally are overfished. Because of the possible overlap in markets, NMFS is concerned that smooth dogfish products can be used as a substitute for spiny dogfish products. If there is market overlap, then declines in spiny dogfish stocks (as is seen internationally) and restrictive management measures (including domestic management) could push, or might have already pushed, effort into the smooth dogfish fishery. Until initial management measures are in place to collect data concerning location, effort, and the status of the stock, NMFS will not be able to determine whether further prescriptive

conservation and management through future FMP amendments and/or regulatory changes are necessary due to the influence of the foregoing and other relevant factors.

As noted in Chapter 1, Section 1.3.5, all smooth dogfish management measures would also apply to Florida smoothhounds (*Mustelus norrisi*).

The following alternatives consider a range of possible management measures for smooth dogfish:

Alternative F1            No Action. Do not add smooth dogfish under NMFS management

Smooth dogfish are not currently managed at the federal level, and under Alternative F1, the No Action alternative, NMFS would not add smooth dogfish under NMFS management and would not implement management measures for smooth dogfish. Furthermore, essential fish habitat (EFH) for smooth dogfish would not be identified and described under the No Action alternative. While no federal action would be taken by NMFS, this alternative would not preclude state or interstate marine fisheries commission management measures.

*Alternative F2            Add smooth dogfish under NMFS management and establish a federal permit requirement-Preferred Alternative*

Alternative F2, the preferred alternative, would implement federal management of smooth dogfish and establish a permit requirement for commercial and recreational retention of smooth dogfish in federal waters. Management measures, including the federal permit and fins attached requirements, would not be implemented until the beginning of the smooth dogfish fishing season in 2012. This delay would allow NMFS to consider and evaluate implications of the final smooth dogfish BiOp, have additional discussions with fishery participants regarding the fins attached requirement and implement the permit requirements.

Under this alternative, the federal permit requirement would allow NMFS to collect data regarding participants in the fishery. Placing smooth dogfish under NMFS management would require that fishermen fishing for smooth dogfish comply with current Atlantic HMS regulations in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea, including the requirement that sharks be offloaded with their fins naturally attached. This alternative would also provide NMFS the ability to select vessels to carry an observer. This alternative would not require fishermen to attend the protected species release, disentanglement, and identification workshops. As NMFS gathers information about the fishery and the fishermen, NMFS may decide to require fishermen attend these workshops as is required in other HMS longline and gillnet fisheries. Over time, NMFS would likely implement logbook or other reporting for smooth dogfish fishermen. NMFS would not do this, however, until the universe of fishermen is known and until NMFS can determine the appropriate mechanism of reporting while minimizing duplication with current reporting requirements. Dealers would be required to report smooth dogfish on HMS dealer reports or through the Standard Atlantic Fisheries Information System (SAFIS). Recreational fishermen would need to obtain either an HMS Angling or Charter/Headboat permit.

Gillnets are the primary gear type used in the smooth dogfish fishery and fishermen using gillnets to target smooth dogfish would be required to comply with federal marine mammal take regulations at 50 CFR 229.32 mandated by the Marine Mammal Protection Act. These regulations and the associated Take Reduction Plans are specific to the region where gillnets are fished. The Take Reduction Plans include the Atlantic Large Whale Take Reduction Plan, the Bottlenose Dolphin Take Reduction Plan, and the Mid-Atlantic Harbor Porpoise Take Reduction Plan.

Trawl gear is occasionally used to catch smooth dogfish incidentally, which are sometimes retained. In line with NMFS' intention to minimize changes to the fishery, fishermen would be allowed to harvest smooth dogfish with trawl gear at incidental levels only. Fishermen would be allowed to harvest smooth dogfish with trawl gear provided sufficient quantities of the target catch are retained to allow for incidental landings of smooth dogfish, similar to the current allowance of swordfish on squid trawl vessels.

As a statutory condition of establishing federal management of smooth dogfish, EFH for the species must be identified and described. Amendment 1 to the 2006 Consolidated HMS FMP extensively analyzed methods for determining EFH, and NMFS considers the conclusions in Amendment 1 to the 2006 Consolidated HMS FMP to be the best available science. As such, no alternatives were considered for designating EFH other than the No Action alternative and the method used in Amendment 1 to the 2006 Consolidated HMS FMP. Chapter 11 of this document summarizes this methodology used to identify and describe smooth dogfish EFH and includes a map of the smooth dogfish EFH boundaries.

On January 16, 2009, NMFS published the final rule for implementing the ACL and AM requirements of the Magnuson-Stevens Act (74 FR 3178). Per the January 2009 final rule, ACLs and AMs apply "unless otherwise provided for under an international agreement in which the United States participates." Given smooth dogfish are not managed under any international agreements, NMFS must follow NSG1 for smooth dogfish. The landings component of the sector-ACL, or commercial quota, would be based on historic landings data spanning 1998-2007 (the last 10 years with complete landings data). Table 2.4 shows the total annual landings by year as well as summary data spanning 1998-2007. The following four alternatives consider a range of quotas based on 1998-2007 summary data. The quota listed in each alternative has been converted from lbs dw to mt dw using the conversion of 1 mt = 2204.6 lbs. The landings data does not show any obvious trends and are likely an underestimate due to underreporting. Due to the lack of a stock assessment, there is no information regarding the stock status of smooth dogfish. Since reliable catch and stock status data is not available, NMFS would establish a quota that would not change current landings. NMFS would account for underharvest and overharvest of smooth dogfish as it does for other shark species and would close the smooth dogfish shark quota with five days notice upon filing in the Federal Register when the smooth dogfish shark quota reaches or is projected to reach 80 percent. This would help prevent overharvest from occurring while still giving the public five days notice that the fishery would close. The four following alternatives consider a range of quota options based on the current level of harvest.

**Table 2.4 Total Annual Landings by Year and Summary Data spanning 1998-2007.**  
Source: ACCSP

Year	Total Annual Landings (lb dw)	Landings Summary	lb dw	mt dw
1998	785,700	Average Annual Landings	950,859	431.3
1999	954,606	Maximum Landings	1,270,137	576.1
2000	776,449	One Standard Deviation	153,591	69.7
2001	880,425	Maximum Landings + One Standard Deviation	1,423,728	645.8
2002	1,037,440	Maximum Landings + Two Standard Deviations	1,577,319	715.5
2003	1,068,279			
2004	1,270,137			
2005	888,017			
2006	821,300			
2007	1,026,243			

Alternative F2a1) Establish a smooth dogfish quota that is equal to the average annual landings from 1998-2007 (431.3 mt dw)

This alternative would set the annual quota equal to the historical average reported annual landings of 431.3 mt dw (950,859 lb dw). Total reported annual catches between 1997 and 2007 had low variability, with a minimum of 776,448 lb dw in 2000 and a maximum of 1,270,137 lb dw in 2004. Assuming that the reported landings are accurate and that all landings are reported, this alternative could allow the fishery to operate at or near its current level of utilization.

Alternative F2a2) Establish a smooth dogfish quota equal to the maximum annual landings from 1998-2007 (576.1 mt dw)

This alternative would set the annual quota at the maximum historical reported annual landing of 576.1 mt dw (1,270,137 lb dw). Assuming that the reported landings are accurate, this alternative would allow the fishery to operate at its current level, and accommodate for the fluctuation of landings. Any levels of utilization at or near the peak landing in 2004 would be permissible under this quota alternative.

Alternative F2a3) Establish a smooth dogfish quota equal to the maximum annual landings from 1998-2007 plus one standard deviation (645.8 mt dw)

Alternative F2a3, previously the preferred alternative in the DEIS, would set the smooth dogfish quota equal to the maximum annual landings between 1998-2007 plus one standard deviation during the same time period (1,270,137 lb dw + 153,591 lb dw), for a total of 645.8 mt dw (1,423,728 lb dw). Similar to alternative F2a2, this alternative attempts to allow the fishery to continue to operate up to the maximum level of utilization

between 1998-2007. However, based on public comment, as detailed below, NMFS does not believe that this alternative would adequately account for underreporting.

*Alternative F2a4) Establish a smooth dogfish quota equal to the maximum annual landings from 1998-2007 plus two standard deviations (715.5 mt dw) – Preferred Alternative*

Alternative F2a4, the preferred alternative, was added by NMFS after the public comment period following publication of the DEIS. Based upon public comment, and input from the SEFSC, NMFS believes that this new preferred alternative better reflects the intent of the previous preferred alternative, and remains within the range of considered alternatives. As stated in the purpose and need, the smooth dogfish management measures are designed to collect data while minimizing changes to the fishery. To achieve this goal, it is important to ensure that the smooth dogfish quota is set at a level that allows current fishing practices to continue. Multiple commenters stated that the proposed smooth dogfish quota was too low, and the SEFSC offered that two standard deviations, rather than one, above the maximum annual landings would better account for underreporting. Two standard deviations above maximum landings is equal to a quota of 715.5 mt dw (1,577,319 lbs dw). Since the fishery has not been previously managed, there have been no reporting requirements in the past. While the data from ACCSP used in this analysis likely included the vast majority of landings, the possibility exists of remaining unreported landings. Alternative F2a4 is preferred at this time because it would allow the fishery to continue to operate even if sources of dogfish mortality that were previously unknown start to be reported.

In addition to the commercial quota established under alternative F2, NMFS must also consider a set-aside quota for activities that collect dogfish for research or for public display. The current set-aside for all shark species under NMFS' jurisdiction is 60 mt ww. The two alternatives below consider a range of options for establishing a smooth dogfish set-aside quota for research and public display:

*Alternative F2b1) Establish a separate smooth dogfish set-aside quota for the exempted fishing program – Preferred Alternative*

Alternative F2b1 would establish a separate smooth dogfish set-aside quota for the exempted fishing program. Currently, there is a 60 mt ww set-aside quota for sharks for the exempted fishing program. However, as smooth dogfish have not been federally managed in the past, smooth dogfish were not included in this 60 mt ww set-aside. Thus, to allow fishermen to take smooth dogfish for research purposes and outside of any established regulations for smooth dogfish, NMFS would establish a separate set-aside for smooth dogfish based on the maximum yearly smooth dogfish takes during research over the past 10 years or six mt ww.

Alternative F2b2) Establish a smooth dogfish set-aside quota for the exempted fishing program and add it to the current 60 mt ww set-aside quota for the exempted fishing program

Under alternative F2b2, NMFS would establish a smooth dogfish set-aside quota for the exempted fishing program and add it to the current 60 mt ww set-aside quota for the exempted fishing program. As explained under alternative F2b1, smooth dogfish are not included in the current 60 mt ww set-aside quota for sharks for the exempted fishing program. Thus, the inclusion of smooth dogfish under the exempted fishing program shark quota set-aside would allow fishermen to take smooth dogfish for research purposes and outside of any established regulations for smooth dogfish. NMFS would establish a set-aside for smooth dogfish based on the maximum yearly smooth dogfish takes during research over the past 10 years or six mt ww, and add it to the existing 60 mt ww research set-aside for a total quota for the exempted fishing program of 66 mt ww.

Alternative F3 Add smooth dogfish under NMFS management and mirror management measures implemented in the Atlantic States Marine Fisheries Commission (ASMFC) Interstate Shark FMP

This alternative would implement federal management of smooth dogfish and use the same methods and management tools implemented by the ASMFC Interstate Shark FMP. NMFS is cognizant of differences in mandates and missions between NMFS and ASMFC and would ensure that any federal measures would comply with federal standards.

In September 2009, the ASMFC approved a smooth dogfish Addendum to the Atlantic Coastal Sharks FMP. Included within this Addendum is an exception for smooth dogfish to allow at-sea processing (*i.e.*, removal of shark fins while still onboard a fishing vessel), removal of recreational retention limits for smooth dogfish, and removal of the two hour net-check requirement for shark gillnets. The at-sea processing exception allows smooth dogfish fishermen to remove the tail and all the fins of a smooth dogfish from March to June. The remainder of the year, July through February, fishermen can remove the tail and all the fins except for the first dorsal fin. In both cases, removed fin weight cannot exceed five percent of the carcass weight. The allowance for the removal of shark fins while still onboard a fishing vessel and removal of the two hour net-check requirement differs from current federal regulations.

## **2.4 Alternatives Considered But Not Further Analyzed**

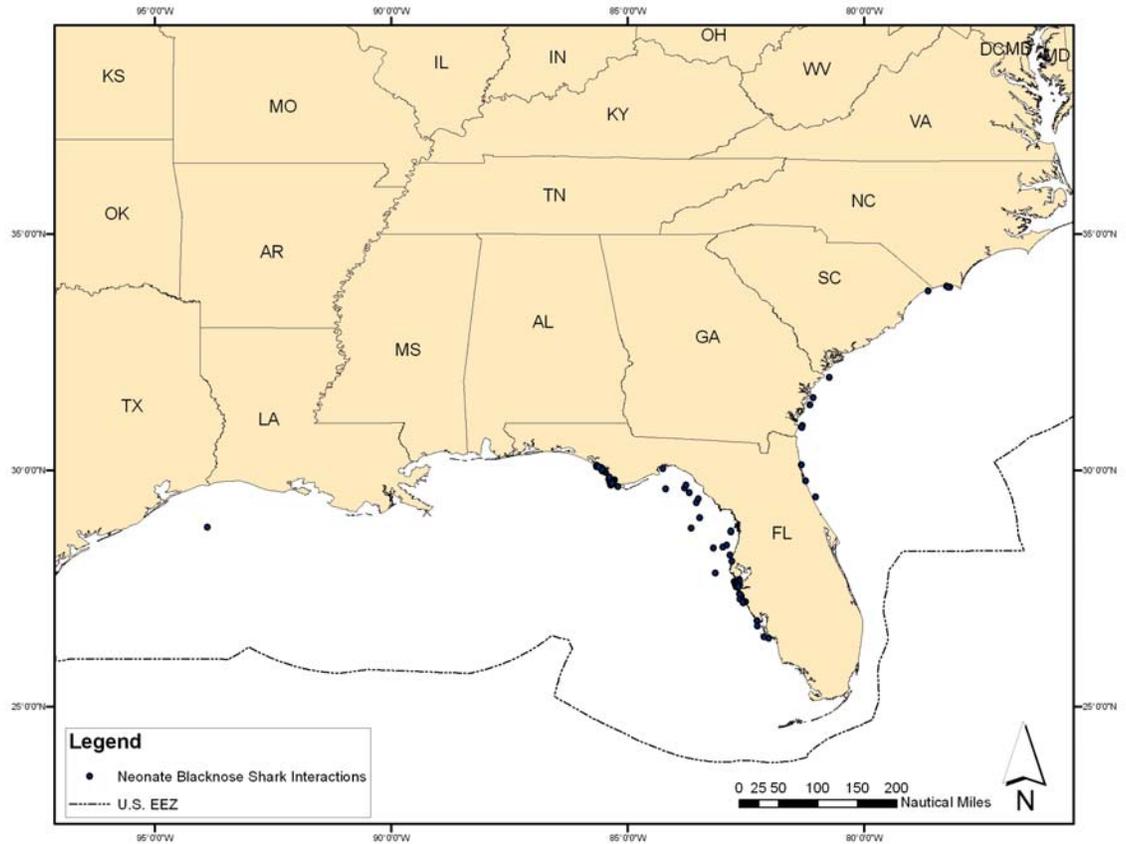
Alternative G1 Establish species-specific quotas for all species in the SCS complex based on average landings; close each quota individually, as needed

While NMFS has been working towards species-specific management for many sharks, species-specific quotas for sharks in the small coastal shark complex could be challenging due to the small size of the individual quotas. Establishing species-specific SCS quotas would result in four small quotas, which could be difficult to monitor and effectively manage. These quotas would be based on average landings resulting in the following quotas: bonnethead = 21 mt; finetooth = 81.6 mt; Atlantic sharpnose = 124.4 mt;

blacknose = 13.5 mt (78 percent reduction of average landings). Individual quotas based on average landings would result in a much lower overall SCS quota, which could have large, negative socioeconomic impacts on shark fishermen. In addition, small quotas would require accurate and timely reporting of landings data to ensure that overharvests do not occur. Given the current reporting frequency of bi-monthly reports from HMS dealers, and the ability to implement larger SCS quotas through other alternatives, NMFS does not believe implementing small species-specific quotas is feasible at this time. Additionally, implementing species-specific quotas could limit flexibility of the fishermen. For instance, there may be some years where there are more Atlantic sharpnose and fewer finetooth sharks than usual. Under the current complex, fishermen would be able to land the greater number of Atlantic sharpnose sharks. Under this alternative, fishermen would be limited in the amount of Atlantic sharpnose sharks because of the species specific quota. This decrease in flexibility could be particularly limiting given the preferred alternative A6, where gillnet fishermen are given the opportunity to show they can target certain species and avoid other species. Therefore, alternative G1 was considered but not further analyzed at this time.

Alternative G2            Establish new time/area closures in blacknose shark nursery areas for all HMS gears

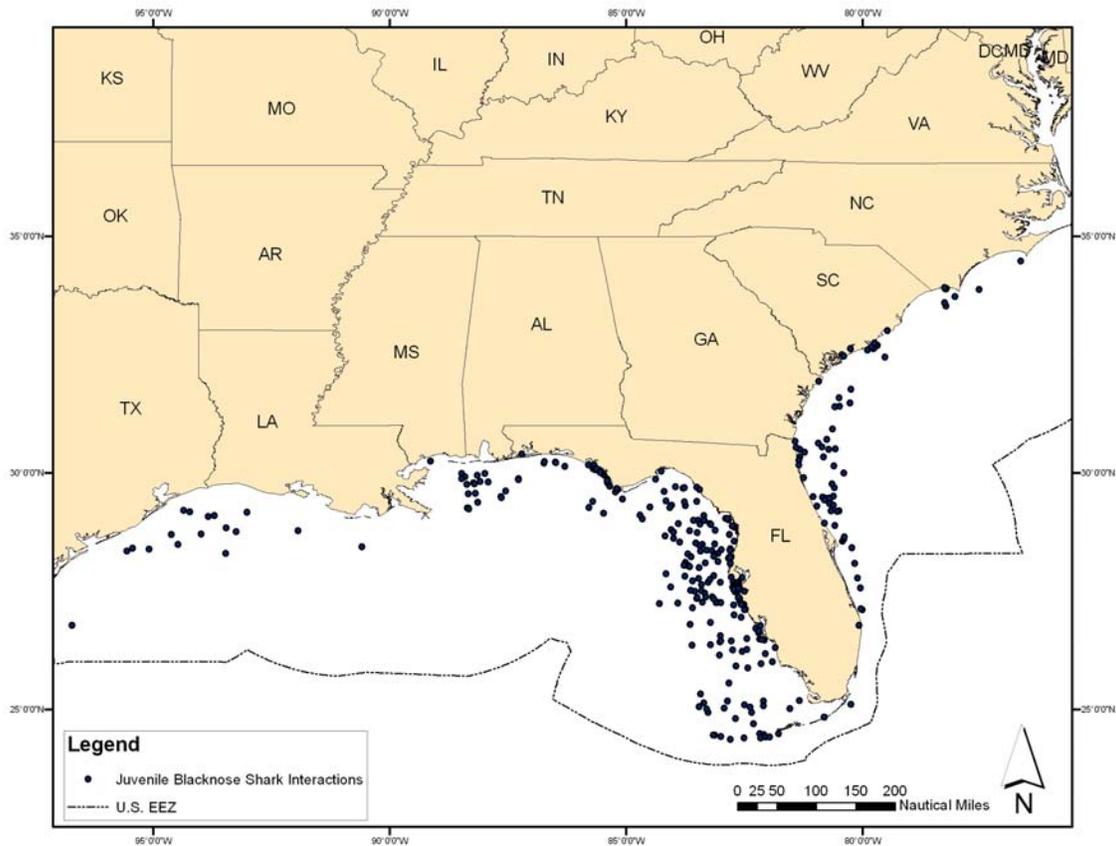
Time/area closures in blacknose shark nursery areas could potentially enhance recruitment of individuals to the stock by protecting neonates and juveniles from high fishing pressure. Identification of discrete nursery areas is essential to avoid non-specific, large closures. Identification of such areas requires catch and/or high catch-per-unit-effort data of neonate and/or juvenile animals within a distinct geographic area. However, available catch data of neonate and juvenile blacknose sharks do not identify distinct geographic areas that can be identified as nursery areas for blacknose sharks (Figure 2.1 and Figure 2.2). Thus, establishing time/area closures in areas where blacknose interactions have occurred would result in large time/area closures in order to be effective. Large closures would likely result in excessive negative socioeconomic impacts on shark fishermen as well as fishermen for other species that catch blacknose sharks as bycatch. Given these potentially large negative impacts and the ability to rebuild blacknose sharks through other alternatives, alternative G2 was considered but not further analyzed at this time.



**Figure 2.1**

**Neonate blacknose shark interactions.**

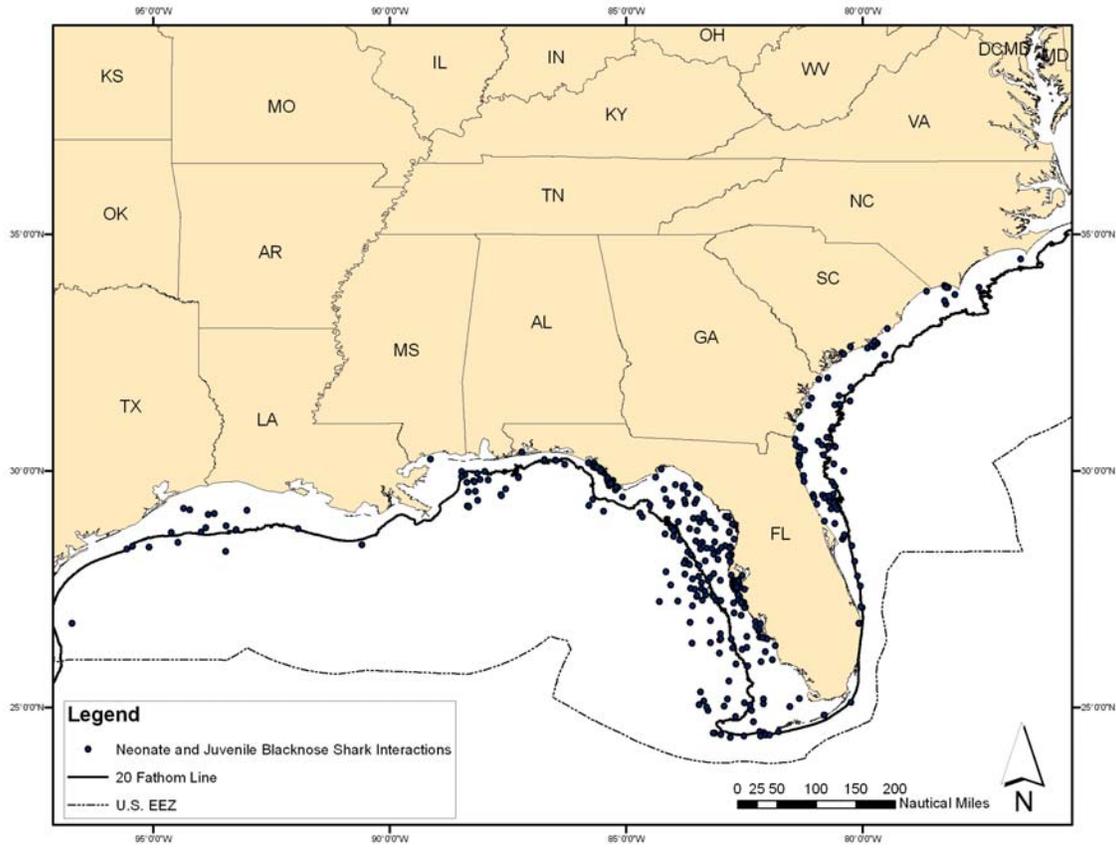
Data sources are from Carlson, 2002; Cooperative Atlantic States Shark Pupping and Nursery Area Program (COASTSPAN); Cooperative Shark Tagging Program (CSTP); Mote Marine Laboratory (MOTE); SEAMAP; Southeast Gillnet Survey (SEGN); Southeast Longline Survey (SELL); and the Shark Observer Program (SOP).



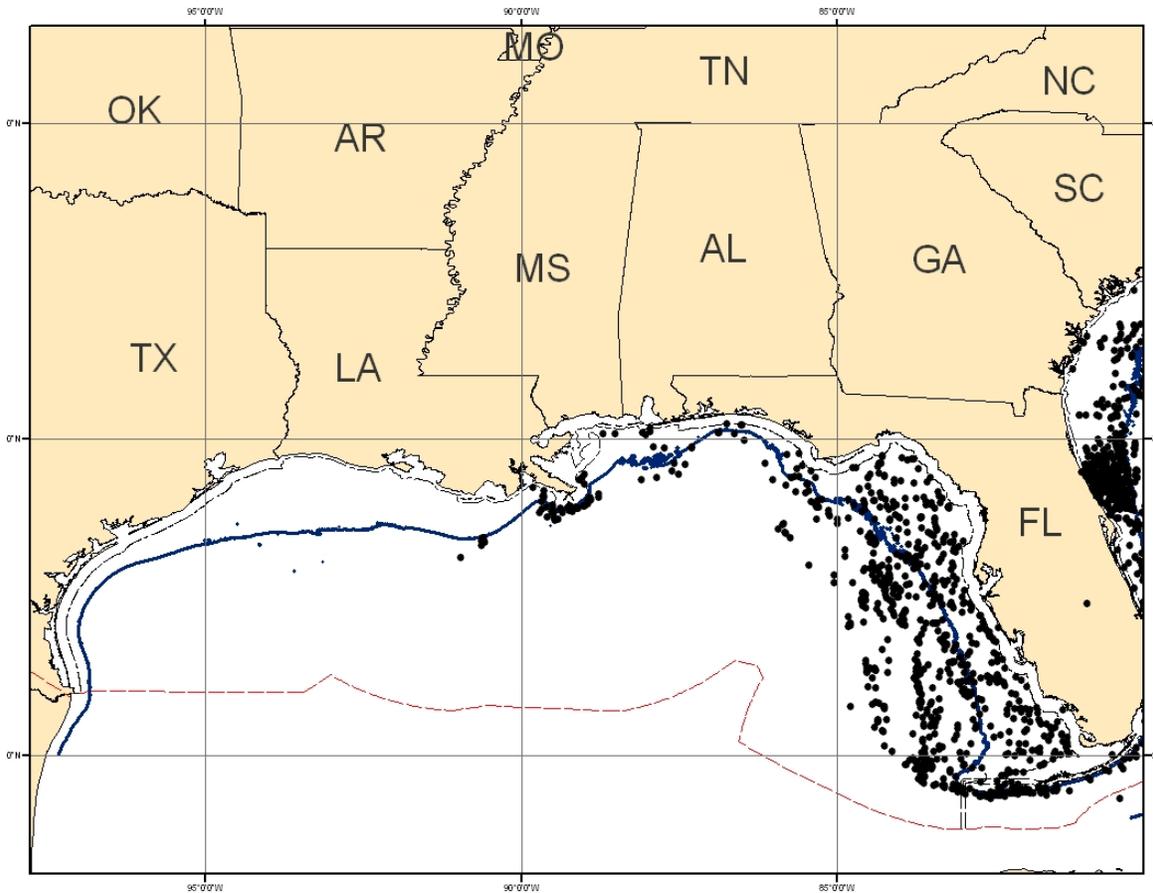
**Figure 2.2 Juvenile blacknose shark interactions.**  
 Data sources are from Carlson, 2002; Cooperative Atlantic States Shark Pupping and Nursery Area Program (COASTSPAN); Cooperative Shark Tagging Program (CSTP); Mote Marine Laboratory (MOTE); SEAMAP; Southeast Gillnet Survey (SEGN); Southeast Longline Survey (SELL); the Shark Observer Program (SOP); Jones and Grace, 2002; and Parsons, 2002.

Alternative G3 Close waters inshore of 20 fathoms in the Gulf of Mexico to shark bottom longline gear

NMFS considered closing waters inshore of 20 fathoms in the Gulf of Mexico to shark BLL gear as a way to reduce fishing pressure on neonate and juvenile blacknose sharks. The majority of the recorded interactions with neonate and juvenile blacknose sharks have been recorded in waters inshore of 20 fathoms (Figure 2.3). Therefore, by closing waters inshore of 20 fathoms, NMFS would relieve fishing pressure on neonate and juvenile blacknose sharks. However, closing waters inshore of 20 fathoms could have a large, negative socioeconomic impact on the shark BLL fishery in the Gulf of Mexico, as the majority of the sharks sets from the observer program from 1994-2007 occurred inshore of 20 fathoms (Figure 2.4). Given these potentially large, negative impacts and the ability to rebuild blacknose sharks through other alternatives, alternative G3 was considered but not further analyzed at this time.



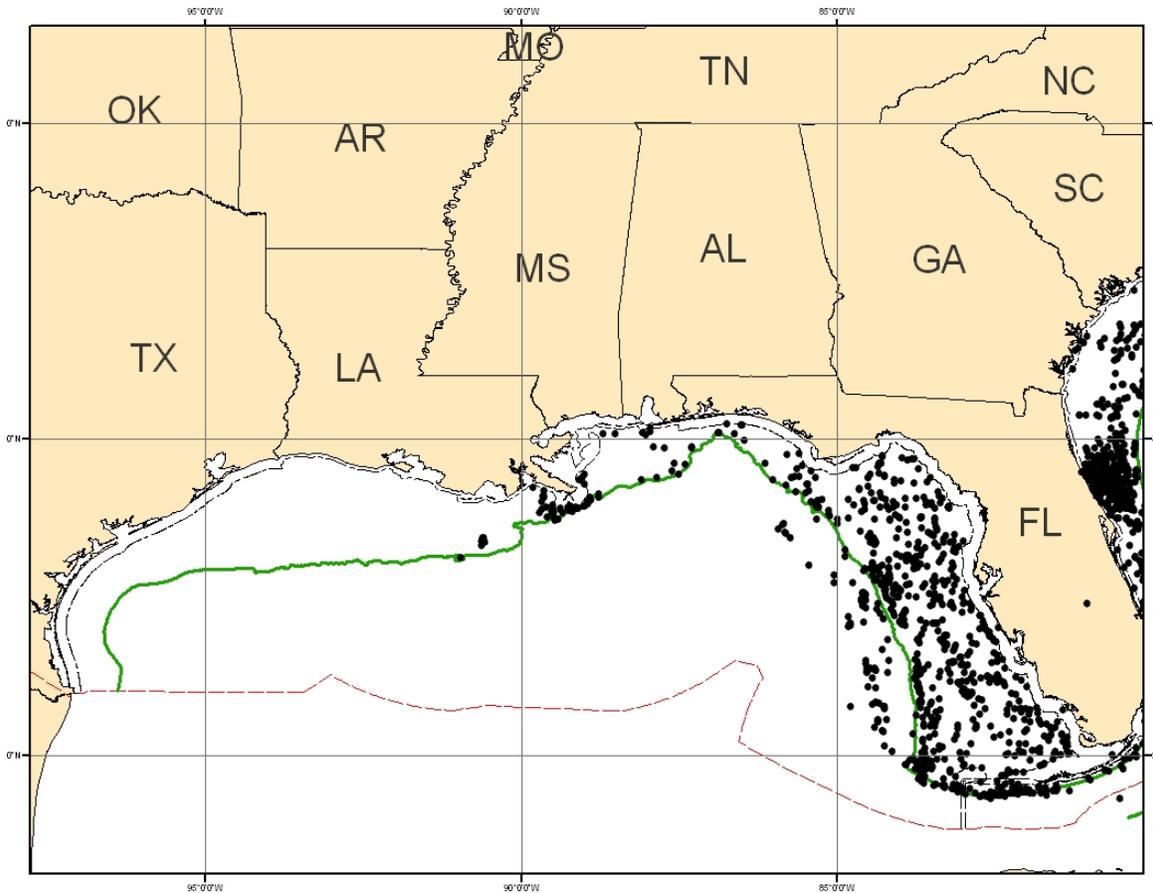
**Figure 2.3** Neonate and juvenile blacknose interactions relative to the 20 fathom line. Data sources the same as Figures 2.1 and 2.2.



**Figure 2.4** Observed BLL sets from 1994-2007 relative to the 20 fathom line. The solid line indicates the 20 fathom line, and the dashed line is the EEZ. The double dashed line off the tip of Florida is the Gulf of Mexico/South Atlantic Fishery Management Council boundary delineation. Source: Shark Observer BLL Program.

Alternative G4 Close waters inshore of 50 fathoms in the Gulf of Mexico to shark bottom longline gear

NMFS considered closing waters inshore of 50 fathoms in the Gulf of Mexico to shark BLL gear as a way to reduce fishing pressure on neonate and juvenile blacknose sharks and to complement the Gulf of Mexico Fishery Management Council’s emergency rule in the Gulf of Mexico region for reef fish BLL gear (74 FR 20229; May 1, 2009). The emergency rule prohibits the use of BLL gear for reef fish in waters less than 50 fathoms for the entire eastern Gulf of Mexico in order to reduce sea turtle interactions. However, closing waters inshore of 50 fathoms would have a large, negative socioeconomic impact on the shark BLL fishery in the Gulf of Mexico, as the majority of the sharks sets from the observer program from 1994-2007 occur inshore of 20 fathoms (Figure 2.5). Given these potentially large, negative impacts and the ability to rebuild blacknose sharks through other alternatives, alternative G3 was considered by not further analyzed at this time.



**Figure 2.5** Observed BLL sets from 1994-2007 relative to the 50 fathom line. The solid line indicates the 50 fathom line, and the dashed line is the EEZ. The double dashed line off the tip of Florida is the Gulf of Mexico/South Atlantic Fishery Management Council boundary delineation. Source: Shark Observer BLL Program.

Alternative G5 Add deepwater sharks to the management unit and place these species on the prohibited list

This alternative would implement federal management of deepwater sharks by placing them on the prohibited list. This action, however, is not likely to have significant ecological benefits since deepwater sharks are not currently targeted in any fishery and are only caught as bycatch. Placing this group on the prohibited list would not prevent bycatch.

Additionally, prohibiting the landing of deepwater sharks would limit data gained from incidental catches. If prohibited, these rarely encountered species would have to be released and could not be landed and submitted for subsequent analysis. Therefore, alternative G5 was considered but not further analyzed at this time.

Alternative G6 Establish catch shares in the Atlantic shark fisheries

A catch share is the allocation of the available fishery quota among participants within the fishery. LAPPs are one type of catch share program. These programs may be

implemented to address numerous issues, including but not limited to: ending the race for fish, reducing overcapitalization, and improving efficiency and safety, while still addressing the biological needs of a stock. These programs can be designed to meet the specific needs of a fishery, provided they meet the requirements outlined in the Magnuson-Stevens Act. Catch shares were not considered for the shark fishery in this amendment because of the ramifications this type of program would have for the existing permit structure and the time required for implementing these programs.

To properly design a catch share program that appropriately considers the views and interests of all stakeholders and then implements such a system would take NMFS several years, and therefore, catch shares were not considered a reasonable alternative for this action given the mandate in § 304(e) of the Magnuson-Stevens Act to have ACLs in place for stocks experiencing overfishing by 2010. However, NMFS is considering revisions to the existing permit structure within HMS fisheries. This could include a catch share program for sharks as well as other HMS as was discussed during the September/October 2008 HMS Advisory Panel. NMFS published an ANPR on June 1, 2009 (74 FR 26174), to initiate broad public participation in considering catch shares for HMS fisheries. On December 10, 2009, NOAA released for public comment a draft policy on the use of catch share programs in fishery management plans ([http://www.nmfs.noaa.gov/sfa/domes\\_fish/catchshare/index.htm](http://www.nmfs.noaa.gov/sfa/domes_fish/catchshare/index.htm)). The draft NOAA policy encourages well-designed catch share programs to help rebuild fisheries and sustain fishermen, communities and vibrant working waterfronts. The draft policy provides a foundation for facilitating the wide-spread voluntary consideration of catch shares, while empowering local fishermen to be part of the process. Any catch share program designed for Atlantic sharks or other HMS would consider the final catch share policy and any comments received in finalizing that policy.

## CHAPTER 3 TABLE OF CONTENTS

<b>Chapter 3 Table of Contents</b> .....	<b>3-i</b>
<b>Chapter 3 List of Tables</b> .....	<b>3-iii</b>
<b>Chapter 3 List of Figures</b> .....	<b>3-vi</b>
<b>3.0 Description of Affected Environment</b> .....	<b>3-1</b>
3.1 Introduction to Highly Migratory Species Management and Highly Migratory Species Fisheries.....	3-1
3.1.1 History of Domestic Shark Management.....	3-2
3.1.2 International Shark Management.....	3-5
3.1.3 Existing State Regulations .....	3-5
3.2 Status of the Stocks.....	3-13
3.2.1 Atlantic Sharks.....	3-14
3.3 Habitat Types and Distributions .....	3-21
3.4 Fishery Data Update .....	3-21
3.4.1 Bottom Longline.....	3-22
3.4.2 Gillnet Fishery .....	3-35
3.4.3 Pelagic Longline Fishery .....	3-45
3.4.4 Recreational Handgear.....	3-57
3.4.5 Fishery Data: Landings by Shark Species .....	3-61
3.5 HMS Permits and Tournaments.....	3-67
3.5.1 Upgrading and Safety Issues.....	3-70
3.5.2 HMS CHB Permits .....	3-70
3.5.3 HMS Angling Permits .....	3-71
3.5.4 Dealer Permits.....	3-72
3.5.5 Exempted Fishing Permits (EFPs), Display Permits, Chartering Permits, and Scientific Research Permits (SRPs).....	3-74
3.5.6 Atlantic HMS Tournaments.....	3-76
3.6 Economic Status of HMS Shark Fisheries.....	3-80
3.6.1 Commercial Fisheries .....	3-81
3.6.2 Recreational Fisheries.....	3-85
3.7 Community and Social Update.....	3-88
3.7.1 Overview of Current Information and Rationale.....	3-89
3.7.2 Methodology.....	3-90
3.7.3 Summary of Social Data and Information .....	3-92
3.8 International Trade and Fish Processing.....	3-92
3.8.1 Overview of International Trade for Atlantic HMS .....	3-92
3.8.2 U.S. Exports of HMS.....	3-93
3.8.3 U.S. Imports of Atlantic HMS.....	3-94
3.9 Bycatch, Incidental Catch, and Protected Species.....	3-95
3.9.1 Bycatch Reduction and the Magnuson-Stevens Act.....	3-96
3.9.2 Standardized Reporting of Bycatch .....	3-97
3.9.3 Bycatch Reduction in HMS Fisheries.....	3-104
3.10 Evaluation and Monitoring of Bycatch.....	3-104
3.10.1 Bycatch Mortality .....	3-105
3.10.2 HMS Fishing Gears with Protected Species.....	3-107

3.10.3	Measures to Address Protected Species Concerns .....	3-115
3.10.4	Bycatch of HMS in Other Fisheries.....	3-116
3.10.5	Evaluation of Other Bycatch Reduction Measures.....	3-118
3.11	Effectiveness of Existing Time/Area Closures in Reducing Bycatch .....	3-119
<b>Chapter 3 References.....</b>		<b>3-122</b>

### CHAPTER 3 LIST OF TABLES

Table 3.1	State Rules and Regulations Pertaining to Sharks, as of January 1, 2010. ....	3-8
Table 3.2	Common names of shark species included within the four species management units under Amendment 2 to the Consolidated HMS FMP. ....	3-16
Table 3.3	Summary Table of Biomass and Fishing Mortality for Small Coastal Sharks (SCS) and Shortfin Mako Sharks. ....	3-19
Table 3.4	Species composition of observed BLL catch during 2008 for BLL trips targeting sharks in the South Atlantic. ....	3-29
Table 3.5	Species composition of observed BLL catch during 2008 for BLL trips targeting sharks in the Gulf of Mexico. ....	3-30
Table 3.6	Total Number of Observed Sea Turtle Interactions by Species by Month for Years 1994-2008 in the Shark BLL Fishery. ....	3-32
Table 3.7	Total number of Observed Sea Turtle Interactions by Year for Years 1994-2008 in the Shark BLL Fishery. ....	3-32
Table 3.8	Total Strike Gillnet Shark Catch and Bycatch by Species in order of Decreasing Abundance for all Observed Trips, 2005-2006. ....	3-40
Table 3.9	Total Shark Catch and bycatch by Species and Species Disposition in Order of Decreasing Abundance for all Observed Drift gillnet Sets 2008. ....	3-41
Table 3.10	Total Sink gillnet Shark Catch and Bycatch by Species in order of Decreasing Abundance for all Observed Trips, 2008. ....	3-42
Table 3.11	Total number of Observed Sea Turtle Interactions by Year from 2000-2008 in the Shark Gillnet Fishery. ....	3-44
Table 3.12	Observed Interactions of Sea Turtles in the PLL Fishery and Directed Shark BLL and Gillnet Fishery by Year and Gear Type (LGH = Loggerhead, LTRB = Leatherback). ....	3-44
Table 3.13	Average Number of Hooks per PLL Set, 1999-2008. ....	3-46
Table 3.14	Observer Coverage of the PLL Fishery. ....	3-48
Table 3.15	Reported Catch of Species Caught by U.S. Atlantic PLLs, in Number of Fish, for 2001-2008. ....	3-49
Table 3.16	ICCAT Bycatch Table (LL, longline; GILL, gillnets; PS, purse-seine; BB, baitboat; HARP, harpoon; TRAP, traps). ....	3-53
Table 3.17	Estimated International Landings of Pelagic Sharks for All Countries in the Atlantic: 2000-2008 (mt ww) <sup>1</sup> . ....	3-56
Table 3.18	Estimates of Total Recreational Harvest of Atlantic Sharks: 1999-2008 (numbers of fish in thousands). ....	3-59
Table 3.19	Recreational Harvest of Selected Atlantic Sharks by Species, in number of fish: 1999-2008. ....	3-59
Table 3.20	Observed or reported number of Atlantic Sharks kept in the rod and reel fishery, Maine through Virginia, 2000 -2008. ....	3-60
Table 3.21	Observed or reported number of Atlantic Sharks released in the rod and reel fishery, Maine through Virginia, 2000 -2008. ....	3-61

Table 3.22	Commercial landings of small coastal sharks in lb dw: 1999-2008. ....	3-62
Table 3.23	Commercial landings of pelagic sharks in lb dw: 1999-2008.....	3-63
Table 3.24	The number of sharks and non-shark species that were discarded alive, discarded dead, and kept under the exempted fishing program during 2008, including exempted fishing permits, display permits, scientific research permits, and letters of acknowledgement. ....	3-64
Table 3.25	Catch history for the Small Coastal Shark complex (numbers of fish). ....	3-65
Table 3.26	Distribution of active Shark Directed and Incidental Permits and Other Permits Held by Shark Fishermen in Other Fisheries. Summarized by State as of November 5, 2009.....	3-68
Table 3.27	Atlantic HMS CHB Permits by State (Principle State on Registration) in 2009.....	3-71
Table 3.28	HMS Angling Permits by State (Principle State on Registration) in 2009.....	3-72
Table 3.29	Number of active shark dealer permits and other permits held by shark dealers by state as of November 6, 2009.....	3-73
Table 3.30	Number of Exempted Fishing Permits (EFPs), Display Permits, Scientific Research Permits (SRPs), Letters of Acknowledgement (LOAs) issued between 2003 and 2009.....	3-75
Table 3.31	Number of Registered HMS Tournaments by State between 2001 and 2008.....	3-77
Table 3.32	Number and Percent of All HMS Tournaments Awarding Points or Prizes for a HMS, 2006-2008.....	3-78
Table 3.33	Registered Pelagic Shark Tournaments, 2008. ....	3-79
Table 3.34	Registered Large Coastal Shark (ridgeback and non-ridgeback) Tournaments, 2008.....	3-79
Table 3.35	Registered Small Coastal Shark Tournaments, 2008.....	3-80
Table 3.36	Inflation Price Indexes. The CPI-U is the standard Consumer Price Index for all urban consumers (1982-1984=100) produced by U.S. Department of Labor Bureau of Labor Statistics.....	3-81
Table 3.37	Average ex-vessel prices per lb (in U.S. dollars) for shark by area.....	3-82
Table 3.38	Estimates of the total ex-vessel annual revenues of Atlantic shark fisheries. ...	3-84
Table 3.39	The overall average wholesale price per lb of fresh HMS sold in Atlantic and Gulf of Mexico states as reported by the Fulton Fish Market.....	3-85
Table 3.40	Average Atlantic HMS charterboat rates for day trips. ....	3-86
Table 3.41	Amount and Value of U.S. Shark Product Exports From 1999-2008. ....	3-94
Table 3.42	U.S. Imports of Shark Products From All Ocean Areas Combined: 1999-2008. ....	3-95
Table 3.43	Summary of bycatch species in HMS fisheries, Marine Mammal Protection Act (MMPA) category, Endangered Species Act (ESA) requirements, data collection, and management measures by fishery/gear type. ....	3-106
Table 3.44	Estimated sea turtle interactions by species in the US Atlantic pelagic longline fishery, 1999-2008, and Incidental Take Levels (ITS).....	3-116

Table 3.45	Estimates of bycatch (numbers of fish) of small coastal sharks in the U.S. south Atlantic and Gulf of Mexico shrimp trawl fisheries and bottom longline fishery relative to total catch.....	3-117
Table 3.46	Estimates of bycatch (numbers of fish) of blacknose sharks in the U.S. south Atlantic and Gulf of Mexico shrimp trawl fisheries and bottom longline fishery relative to total catch.....	3-117
Table 3.47	Total number of swordfish, bluefin tuna, yellowfin tuna, bigeye tuna, total BAYS (bigeye, albacore, yellowfin and skipjack tuna), reported landed or discarded in the U.S. Atlantic PLL fishery, 1997 – 2008, and percent change from 1997-99. ....	3-121

**CHAPTER 3 LIST OF FIGURES**

Figure 3.1 Illustration of the status determination and rebuilding terms. .... 3-13  
Figure 3.2 Observed sea turtle interactions in the shark BLL fishery from 1994-2008..... 3-33  
Figure 3.3 Observed sawfish interactions in the shark BLL fishery from 1994-2008..... 3-34  
Figure 3.4 Typical U.S. PLL Gear. .... 3-45  
Figure 3.5 Aggregate Distribution of Hooks Deployed by All ICCAT Parties 2000-2006. ....  
..... 3-52

### **3.0 DESCRIPTION OF AFFECTED ENVIRONMENT**

This chapter serves several purposes. It describes the affected environment (e.g., the fishery, the gears used, and the communities involved), and provides a view of the current condition of the fishery, which serves as a baseline against which to compare impacts of the different alternatives. This chapter also provides a summary of information concerning the biological status of shark stocks; the marine ecosystems in the fishery management unit; the social and economic condition of the fishing interests, fishing communities, and fish processing industries; and the best available scientific information concerning the past, present, and possible future condition of shark stocks, ecosystems, and fisheries. The social and economic condition of participants in the fishery, fishing interests, fishing communities, and fish processing industries included in this chapter provides the baseline information necessary for NMFS to conduct analyses to meet the requirements, not only of NEPA, but also the Magnuson-Stevens Act mandates to consider the social and economic effects of the proposed amendments on fishing dependent communities and participants in affected fisheries and consider measures to minimize and mitigate adverse effects pursuant to National Standard 8, 16 U.S.C. §1851(a)(8); prepare a Fisheries Impact Statement pursuant to 16 U.S.C. §1853(a)(9); and comply with HMS FMP specific requirements set forth in 16 U.S.C. §1854(g)(1)(c). This data, in conjunction with the corresponding analysis in Chapter 4, is relied on but not repeated in Chapter 9 where the foregoing required analyses are synthesized in the Fisheries Impact Statement (Chapter 9, Section 9.4).

#### **3.1 Introduction to Highly Migratory Species Management and Highly Migratory Species Fisheries**

Atlantic HMS fisheries are managed directly by the Secretary of Commerce, who designated that responsibility to the NMFS. The HMS Management Division within NMFS is the lead in developing regulations for HMS fisheries, although some actions (e.g., Large Whale Take Reduction Plan) are taken by other NMFS offices if the main legislation (e.g., Marine Mammal Protection Act) driving the action is not the Magnuson-Stevens Act or Atlantic Tunas Convention Act (ATCA). Because of their migratory nature, HMS fisheries require management at the international, federal, and state levels. NMFS manages HMS fisheries in federal waters (domestic) and the high seas (international) while individual states establish regulations for some HMS in their own waters. There are exceptions to this generalization. For example, federally-permitted commercial shark fishermen, as a condition of their permit, are required to follow federal regulations in all waters, including state water, unless the state has more restrictive regulations, in which case the state laws prevail. Additionally, in 2005, the Atlantic States Marine Fisheries Commission (ASMFC) agreed to develop an interstate coastal shark FMP. This interstate FMP coordinates management measures among all states along the Atlantic coast (Florida to Maine). NMFS participated in the development of this interstate shark FMP, which will be in effect as of January 1, 2010.

Generally, on the domestic level, NMFS implements relevant international agreements and management measures that are required under domestic laws such as the Magnuson-Stevens Act. While NMFS does not generally manage HMS fisheries in state waters, states are invited to send representatives to Advisory Panel (AP) meetings and to participate in stock assessments,

public hearings, or other fora. NMFS is working to improve its communication and coordination with state agencies. In 2006, NMFS reviewed the shark regulations of several states and has asked for some states to consider changing their regulations to become more consistent with federal regulations. This request resulted in changes and dialogues with certain states regarding the regulations such as the Commonwealth of Virginia the State of North Carolina, the State of Florida, the State of Louisiana, and the State of Maine. NMFS appreciates these ongoing dialogs and intends to continue to work with states, to the extent practicable, to ensure complementary regulations. Please see Section 3.1.3 for more information regarding regulations by state.

On the international level, NMFS participates in the stock assessments conducted by the International Commission for the Conservation of Atlantic Tunas' (ICCAT) Standing Committee on Research and Statistics (SCRS) and in the annual ICCAT meetings. In regard to sharks, ICCAT currently assesses two pelagic shark species in the Atlantic Ocean: the blue and the shortfin mako. Stock assessments and management recommendations or resolutions are listed on ICCAT's website at <http://www.iccat.es/>. ATCA requires NMFS to promulgate regulations as may be "necessary and appropriate" to carry out ICCAT recommendations. NMFS also actively participates in other international bodies that could affect U.S. shark fishermen and the shark industry including Convention on International Trade in Endangered Species (CITES) and the Food and Agriculture Organization of the United Nations (FAO). More information on the current status of shark stocks and the dates of the next ICCAT stock assessments are provided in Section 3.2.

### **3.1.1 History of Domestic Shark Management**

Atlantic sharks are federally managed along with other HMS species. Thus, management of the shark fishery is presented in FMPs along with Atlantic billfish, Atlantic tunas, and Atlantic swordfish. This section gives a relatively brief history of the management of Atlantic sharks. This history is organized by previous FMPs. For more detail regarding the history of management and of other HMS species besides sharks, please see the original documents. Proposed rule, final rules, and other official notices can be found in the Federal Register at <http://www.gpoaccess.gov/fr/index.html>. Supporting documents can be found on the HMS Management Division webpage at <http://www.nmfs.noaa.gov/sfa/hms>. Documents can also be requested by calling the HMS Management Division at (301) 713-2347.

In 1989, the five Atlantic Fishery Management Councils asked the Secretary of Commerce to develop a Shark FMP. The Councils were concerned about the late maturity and low fecundity of sharks, the increase in fishing mortality, and the possibility of the resource being overfished. The Councils requested that the FMP cap commercial fishing effort, establish a recreational bag limit, prohibit "finning," and begin a data collection system. In 1993, the Secretary of Commerce, through NMFS, implemented the FMP for Sharks of the Atlantic Ocean (1993 Shark FMP).

The 1999 FMP for Atlantic Tunas, Swordfish, and Sharks replaced the 1993 Atlantic Shark FMP. Detailed information on management measures implemented in the 1999 FMP can be found in the 2009 Stock Assessment and Fishery Evaluation (SAFE) Report for Atlantic HMS.

Since the 1999 FMP, there have been a number of other shark regulatory actions in addition to the rules mentioned above. Below is a short list of some of these actions.

- National Plan of Action for the Conservation and Management of Sharks: On February 15, 2001, NMFS released the final National Plan of Action (NPOA) for the Conservation and Management of Sharks (66 FR 10484). The NPOA was developed pursuant to the endorsement of the International Plan of Action (IPOA) by the United Nations' FAO Committee on Fisheries Ministerial Meeting in February 1999. The overall objective of the IPOA is to ensure conservation and management of sharks and their long-term sustainable use. The final NPOA, consistent with the Magnuson-Stevens Act, requires NMFS and the Regional Fishery Management Councils to undertake extensive data collection, analysis, and management measures in order to ensure the long-term sustainability of U.S. shark fisheries. The NPOA also encourages Interstate Marine Fisheries Commissions and State agencies to initiate or expand current data collection, analysis, and management measures and to implement regulations consistent with federal regulations, as needed. For additional information on the U.S. NPOA and its implementation, see <http://www.nmfs.noaa.gov>.
- Shark Finning Prohibition Act: On December 21, 2000, President Clinton signed the Shark Finning Prohibition Act into law (Public Law 106-557). This amended the Magnuson-Stevens Act to prohibit any person under U.S. jurisdiction from (i) engaging in the finning of sharks; (ii) possessing shark fins aboard a fishing vessel without the corresponding carcass; and (iii) landing shark fins without the corresponding carcass. The Act also established a presumption that illegal finning had occurred in fins taken aboard or landed from a vessel exceed five percent of the weight of the corresponding carcasses. NMFS published final regulations on February 11, 2002 (67 FR 6194). These regulations prohibit the finning of sharks, possession of sharks without the corresponding carcasses, and landings of shark carcasses without the corresponding carcasses in U.S. fisheries in the EEZ and on the high seas.
- Recreational permits and reporting requirements: On December 18, 2002 (67 FR 77434), NMFS published a final rule requiring all vessel owners fishing recreationally (*i.e.*, no sale) for Atlantic HMS, including billfish, to obtain an Atlantic HMS recreational angling category permit. On January 7, 2003 (68 FR 711), a final rule establishing a mandatory reporting system for all non-tournament recreational landings of Atlantic marlins, sailfish, and swordfish was published. These requirements became effective in March 2003.

Other regulatory actions that have been taken, including the opening and closing of fisheries and adjustments to quota allocations. All of these actions are not listed here but can be found by searching the Federal Register webpage at <http://www.gpoaccess.gov/fr/index.html> or by reviewing the annual HMS Stock Assessment and Fishery Evaluation (SAFE) Reports (<http://www.nmfs.noaa.gov/sfa/hms>).

### ***3.1.1.1 2006 Consolidated HMS FMP and Beyond***

In July 2006, the final Consolidated HMS FMP was completed and the implementing regulations were published on October 2, 2006 (71 FR 58058). The 2006 Consolidated HMS FMP combined all HMS management into one FMP, changed certain management measures for various HMS, adjusted the regulatory framework measures, and continued the process for updating HMS EFH. Measures that are specific to the shark fisheries included mandatory workshops and certifications for all vessel owners and operators that have PLL or BLL gear on their vessels and that have been issued or are required to be issued any of the HMS limited access permits (LAPs) to participate in HMS longline and gillnet fisheries. Additional measures specific to sharks include the differentiation between PLL and BLL gear based upon the species composition of the catch onboard or landed, the requirement that the second dorsal fin and the anal fin remain on all Atlantic sharks through landing, and a new prohibition making it illegal for any person to sell or purchase any HMS that was offloaded from an individual vessel in excess of the retention limits specified in § 635.23 and 635.24. The 2006 Consolidated HMS FMP also implemented complementary HMS management measures in Madison-Swanson and Steamboat Lumps Marine Reserves and established criteria to consider when implementing new time/area closures or making modifications to existing time/area closures. The 2006 Consolidated HMS FMP also included a plan for preventing overfishing of finetooth sharks by expanding observer coverage, collecting more information on where finetooth sharks are being landed, and coordinating with other fisheries management entities that are contributing to finetooth shark fishing mortality.

In 2007, NMFS expanded the equipment required for the safe handling, release, and disentanglement of sea turtles caught in the Atlantic shark BLL fishery (72 FR 5633, February 7, 2007). As a result, equipment required for BLL vessels is now consistent with the requirements for the PLL fishery. Furthermore, this action implemented several year-round BLL closures to protect EFH to maintain consistency with the Caribbean Fishery Management Council.

### ***3.1.1.2 Amendment 1 to the Consolidated HMS FMP***

On June 12, 2009, NMFS published the Notice of Availability for Final Amendment 1 to the Consolidated HMS FMP for Essential Fish Habitat (EFH)(74 FR 28018). The amendment updated EFH for Atlantic highly migratory species including designation of a new Habitat Area of Particular Concern (HAPC) for bluefin tuna in the Gulf of Mexico. The amendment also analyzed potential fishing impacts on EFH and concluded that HMS gears were not having more than a minimal and temporary effect on EFH. As a result, no management measures were proposed to minimize fishing impacts.

### ***3.1.1.3 Amendment 2 to the Consolidated HMS FMP***

On April 10, 2008, NMFS released the Final Environmental Impact Statement for Amendment 2 to the Consolidated HMS FMP based on several stock assessments that were completed in 2005/2006. Assessments for dusky (*Carcharhinus obscurus*) and sandbar (*C. plumbeus*) sharks indicated that these species are overfished with overfishing occurring and that porbeagle sharks (*Lamna nasus*) are overfished. NMFS implemented management measures consistent with recent stock assessments for sandbar, porbeagle, dusky, blacktip (*C. limbatus*)

and the LCS complex. The implementing regulations were published on June 24, 2008 (73 FR 35778; corrected version published July 15, 2008; 73 FR 40658). Management measures implemented in Amendment 2 included:

- Initiating rebuilding plans for porbeagle, dusky, and sandbar sharks consistent with stock assessments;
- Implementing commercial quotas and retention limits consistent with stock assessment recommendations to prevent overfishing and rebuild overfished stocks;
- Modifying recreational measures to reduce fishing mortality of overfished/overfishing stocks;
- Modifying reporting requirements;
- Modifying timing of shark stock assessments;
- Clarifying timing of release for annual SAFE reports;
- Updating dehooking requirements for smalltooth sawfish;
- Requiring that all Atlantic sharks be offloaded with fins naturally attached;
- Collecting shark life history information via the implementation of a shark research program; and,
- Implementing time/area closures recommended by the South Atlantic Fishery Management Council.

### **3.1.2 International Shark Management**

ICCAT is responsible for the conservation of tunas, tuna-like species, and other species that interact with tuna fisheries in the Atlantic Ocean and adjacent seas. Other species that interact with tuna fisheries include the following pelagic sharks only: the Atlantic blue shark, the porbeagle shark and the shortfin mako. The organization was established at a Conference of Plenipotentiaries, which prepared and adopted the International Convention for the Conservation of Atlantic Tunas, signed in Rio de Janeiro, Brazil, in 1966. For purposes of clarity, it should be understood that ICCAT recommendations are binding instruments for Contracting Parties while ICCAT resolutions are non-binding and express the will of the Commission. All ICCAT recommendations and resolutions are available on the ICCAT website at <http://www.ICCAT.es>. Under ATCA, however, NMFS has must promulgate regulations as “necessary and appropriate” to implement ICCAT recommendations.

A detailed summary of ICCAT Recommendations and Resolutions can be found in the 2009 U.S. National Report to ICCAT (NMFS, 2009).

### **3.1.3 Existing State Regulations**

Table 3.1 outlines the existing state regulations as of January 1, 2010, with regard to shark species. While the HMS Management Division updates this table periodically throughout the year, persons interested in the current regulations for any state should contact that state directly.

The Atlantic States Marine Fisheries Commission (ASMFC) is composed of 15 member states along the Atlantic coast from Maine to Florida. The Gulf States Marine Fisheries Commission is composed of five member states along the Gulf of Mexico from Florida to Texas. Through the Commissions, member states coordinate fisheries management measures to create consistent regulations and ensure stocks are protected across state boundaries. In August 2008, the ASMFC approved the Interstate Fishery Management Plan (FMP) for Atlantic Coastal Sharks. This FMP was modified via Coastal Sharks Addendum I in September 2009. The management measures for coastal shark species in the FMP and Addendum I are to be implemented by ASMFC member states by January 1, 2010. States can implement more restrictive management measures or can apply for *de minimis* status, as appropriate. The measures in the Interstate FMP for Coastal Sharks, as summarized from the ASMFC Coastal Shark FMP Executive Summary, include:

#### Recreational Measures:

1. Recreational anglers are prohibited from possessing silky (*Carcharhinus falciformis*), tiger (*Galeocerdo cuvier*), blacktip (*C. limbatus*), spinner (*C. brevipinna*), bull (*C. leucas*), lemon (*Negaprion brevirostris*), nurse (*Ginglymostoma cirratum*), scalloped hammerhead (*Sphyrna lewini*), great hammerhead (*S. mokarran*), and smooth hammerhead (*S. zygaena*) in the state waters of Virginia, Maryland, Delaware and New Jersey from May 15 through July 15—regardless of where the shark was caught
2. Recreational anglers are prohibited from possessing any shark species that is illegal to catch or land by recreational anglers in federal waters.
3. All sharks caught by recreational fishermen must have head, tail, and fins attached to the carcass.
4. Sharks caught in the recreational fishery must have a fork length of at least 4.5 feet with the exception of Atlantic sharpnose, blacknose, finetooth, bonnethead, and smooth dogfish.
5. Recreational anglers may only use handlines and rod and reel.
6. Each recreational shore-angler is allowed a maximum harvest of one shark from the federal recreationally permitted species, plus one additional bonnethead, and one additional Atlantic sharpnose, per calendar day. Recreational fishing vessels are allowed a maximum harvest of one shark from the federal recreationally permitted species plus one additional one bonnethead, and one Atlantic sharpnose, per trip, regardless of the number of people on board the vessel. Smooth dogfish do not count toward the retention limit.

#### Commercial Measures:

1. All commercial fishermen are prohibited from possessing silky, tiger, blacktip, spinner, bull, lemon, nurse, scalloped hammerhead, great hammerhead, and smooth hammerhead in the state waters of Virginia, Maryland, Delaware and New Jersey from May 15 through July 15.
2. States will close the fishery for any shark species when NOAA Fisheries closes the fishery in federal waters.
3. States will implement possession limits as annually specified.

4. Commercial shark fishermen must hold a state commercial license or permit in order to commercially catch and sell sharks in state waters.
5. States may grant exemptions from the seasonal closure, quota, possession limit, size limit, gear restrictions, and prohibited species restrictions contained in this plan through a state display or research permit system.
6. A federal Commercial Shark Dealer Permit is required to buy and sell any shark caught in state waters.
7. Prohibits the use of any gear type other than rod and reel, handlines, small mesh gillnets, large mesh gillnets, trawl nets, shortlines, pound nets/fish traps, or weirs.
8. States must implement shortline and gillnet bycatch reduction measures.
9. All sharks caught by commercial fishermen must have tails and fins attached naturally to the carcass through landing, except for smooth dogfish. Commercial fishermen may completely remove the fins of smooth dogfish from March through June of each year. If fins are removed, the total wet weight of the shark fins may not exceed 5 percent of the total dressed weight of smooth dogfish carcasses. From July through February each year, commercial fishermen may completely remove the head, tail, pectoral fins, pelvic (ventral) fins, anal fin, and second dorsal fin, but must keep the dorsal fin attached naturally to the carcass through landing.
10. A state can request permission to implement an alternative to any mandatory compliance measure only if that state can show to the Board's satisfaction that its alternative proposal will have the same conservation value as the measure contained in this management plan or any addenda prepared under Adaptive Management.

**Table 3.1 State Rules and Regulations Pertaining to Sharks, as of January 1, 2010.**

Please note that state regulations are subject to change. Please contact the appropriate state personnel to ensure that the regulations listed below remain current. X = Regulations in Effect; n = Regulation Repealed; FL = Fork Length; CL = Carcass Length; TL = Total Length; LJFL = Lower Jaw Fork Length; CFL = Curved Fork Length; DW = Dressed Weight; and SCS = Small Coastal Sharks; LCS = Large Coastal Sharks.

State	Cite Reference	Regulatory Details	Contact Information
ME	Code ME R. 13-188 ' 50.01(1) and 50.10	Regulations apply to spiny dogfish only	ME Department of Marine Resources George Lapointe Phone: 207/624-6553 Fax: 207/624-6024
NH	FIS 603.19 and 603.20	Regulations apply to coastal sharks, spiny and smooth dogfish; Prohibited sharks listed; Federal Dealer permit required for all shark dealers; Porbeagle sharks can only be landed in the recreational fishery	NH Fish and Game Douglas Grout Phone: 603/868-1095 Fax: 603/868-3305
MA	322 CMR 6.35 & 6.37 <u>CMRs</u> available online at <a href="http://www.mass.gov/dfwele/dmf/commercialfishing/cmr_index.htm">http://www.mass.gov/dfwele/dmf/commercialfishing/cmr_index.htm</a>	Regulations apply to coastal sharks, spiny and smooth dogfish	MA Division of Marine Fisheries Melanie Griffin Phone: 617/626-1528 Fax: 617/626-1509
RI	RIMFC Regulations ' 7.15	Regulations apply to spiny dogfish only	RI Department of Environment Management Brian Murphy Phone: 401/783-2304
CT	Regulations of Connecticut State Agencies § 26-159a-19	Regulations apply to spiny dogfish only	CT Department of Environmental Protection David Simpson Phone: 860/434-6043 Fax: 860/434-6150
NY	NY Environmental Conservation ' 13-0338; State of New York Codes, Rules and Regulations (Section 40.1)	Shark finning prohibited; Reference to the Federal regulations 50 CFR part 635; Prohibited sharks listed; In the process of adopting into regulation all measures of the ASMFC Interstate Fishery Management Plan for Atlantic Coastal Sharks (August 2008); It will be effective early 2010	NY Department of Environmental Conservation Phone: 631/444-0430 Fax: 631/444-0449

State	Cite Reference	Regulatory Details	Contact Information
NJ	NJ Administrative Code, Title 7. Department of Environmental Protection, NJAC 7:25-18.1 and 7:25-18.12(d)	Commercial/Recreational: min size 48" TL or 23" from the origin of the first dorsal fin to pre-caudal pit; Possession limit - 2 fish/vessel or 2 fish per person if fishing from shore or a land based structure; Must hold federal permit to possess or sell more than 2 sharks; No sale during Federal closures; Finning prohibited; Prohibited Species: basking, bigeye sand tiger, sand tiger, whale and white sharks	NJ Fish and Wildlife Hugh Carberry Phone: 609/748-2020 Fax: 609/748-2032
DE	DE Code Regulations 3541	Reference to federal regulations for sharks; Recreational/Commercial: min size – 54" FL; Bag limit – 1 shark/vessel/trip; Shorebound anglers – 1 shark/person/day; 2 Atlantic sharpnose/vessel/trip with no min size; Prohibited Species: same as federal species; Prohibition against fins that are not naturally attached to the body	DE Division of Fish and Wildlife Craig Shirey Phone: 302/739-9914
MD	Code of Maryland Regulations 08.02.12.03 and 08.02.22.01-.04	Reference to listing sharks of the order Squaliformes as in need of conservation; Adopted into regulation all measures of the ASMFC Interstate Fishery Management Plan for Atlantic Coastal Sharks (August 2008); It became effective March 23, 2009	MD Department of Natural Resources Harley Speir Phone: 410/260-8264
VA	4 VA Administrative Code 20-490	Recreational: bag limit – 1 LCS, SCS, or pelagic shark/vessel/day with a min size of less than 54" FL or 30" CL; 1 Atlantic sharpnose and bonnethead/person/day with no min size; No limits on rec harvest of smooth and spiny dogfish; Commercial: possession limit - 4000 lb dw/day, min size - 58" FL or 31" CL west of the COLREGS line and no min size limit east of the COLREGS line; Prohibitions: fillet at sea, finning, longlining, same prohibited shark species as federal regulations; and spiny dogfish commercial regulations	VA Marine Resources Commission Jack Travelstead Phone: 757/247-2247 Fax: 757/247-2020

State	Cite Reference	Regulatory Details	Contact Information
NC	NC Administrative Code tit. 15A, r.3M.0505; Proclamation FF-38-2006	Director may impose restrictions for size, seasons, areas, quantity, <i>etc.</i> via proclamation; Commercial: open seasons and species groups same as Federal; 33 non-sandbar LCS retention limit; no retention of sandbar sharks; fins naturally attached to shark carcass; LL shall only be used to harvest LCS during open season, shall not exceed 500 yds or have more than 50 hooks; Recreational: LCS (54" FL min size) - no more than 1 shark/vessel/day or 1 shark/person/day, SCS (no min size) – no more than 1 finetooth or blacknose shark/vessel/day and no more than 1 Atlantic sharpnose and 1 bonnethead/person/day, pelagics (no min size) -1 shark/vessel/day; Same prohibited shark species as federal regulations	NC Division of Marine Fisheries Randy Gregory Phone: 252/726-7021 Fax: 252/726-0254
SC	SC Code Ann. ' 50-5-2730	Recreational: 2 Atlantic sharpnose/per/day and 1 bonnethead/person/day, no min size; All others – 1 shark/boat/trip, min size – 54" FL; Gillnets are prohibited in State waters; Reference to federal commercial regulations and prohibited species	SC Department of Natural Resources Wallace Jenkins Phone: 843/953-9835 Fax: 843/953-9386
GA	GA Code Ann. ' 27-4-130.1; OCGA ' 27-4-7(b); GA Comp. R. & Regs. ' 391-2-4-.04	Gear Restrictions/Prohibitions - Use of gillnets and longlines is prohibited in state waters; Commercial/Recreational: 1 shark from the Small Shark Composite (bonnethead, sharpnose, and spiny dogfish, min size 30" FL; All other sharks - 1 shark/person or boat, whichever is less, min size 54" FL, Prohibited Species: sand tiger sharks, sandbar, silky, bigeye sand tiger, whale, basking, white, dusky, bignose, Galapagos, night, reef, narrowtooth, Caribbean sharpnose, smalltail, Atlantic angel, longfin mako, bigeye thresher, sharpnose sevengill, bluntnose sixgill, and bigeye sixgill; All species must be landed head and fins intact; Sharks may not be landed in Georgia if harvested using gillnets	GA Department of Natural Resources Carolyn Belcher Phone: 912/264-7218 Fax: 912/262-3143

State	Cite Reference	Regulatory Details	Contact Information
FL	FL Administrative Code Ann. r.68B-44, F.A.C	Commercial/recreational: min size – 54” except no min. size on blacknose, blacktip, bonnethead, smooth dogfish, finetooth, Atlantic sharpnose; Possession limit – 1 shark/person/day, max. 2 sharks/vessel on any vessel with 2 or more persons on board; Allowable gear – hook and line only; State waters close to commercial harvest when adjacent federal waters close; Federal permit required for commercial harvest, so federal regulations apply in state waters unless state regulations are more restrictive; Finning & filleting prohibited; Prohibited species same as federal regulations	FL Fish and Wildlife Conservation Commission Lisa Gregg Phone: 850/487-0554 Fax: 850/487-4847
AL	AL Administrative Code r. 220-2-.46, r.220-3-.30, r.220-3-.37	Recreational & commercial: bag limit – 1 sharpnose/person/day and 1 bonnethead/person/day; no min size; all other sharks – 1/person/day; min size – 54” FL or 30” dressed; state waters close when Federal season closes; no shark fishing on weekends, Memorial Day, Independence Day, or Labor Day; Prohibited species: Atlantic angel, bigeye thresher, dusky, longfin make, sand tiger, basking, whale, white, and nurse sharks	AL Department of Conservation and Natural Resources Major Jenkins <a href="mailto:jjenkins@dcnr.state.al.us">jjenkins@dcnr.state.al.us</a> Phone: 251 861 2882
LA	LA Administrative Code Title 76, Pt. VII, Ch. 3, § 357	Recreational: min size – 54” FL, except Atlantic sharpnose and bonnethead; bag limit - 1 sharpnose/person/day, all other sharks – 1 fish/person/day; Commercial: 33 per vessel per trip limit; no min size; Com & rec harvest prohibited: 4/1-6/30; Prohibited species: same as federal regulations	LA Department of Wildlife and Fisheries Harry Blanchet 225 765-2889 fax (225) 765-2489 <a href="mailto:hblanchet@wlf.louisiana.gov">hblanchet@wlf.louisiana.gov</a>
MS	MS Code Title-22 part 7	Recreational: min size - LCS/Pelagics 37” TL; SCS 25” TL; bag limit - LCS/Pelagics 1/person up to 3/vessel; SCS 4/person; Commercial and prohibited species - Reference to federal regulations	MS Department of Marine Resources Kerwin Cuevas Phone: 228/374-5000

State	Cite Reference	Regulatory Details	Contact Information
TX	TX Administrative Code Title 31, Part 2, Parks and Wildlife Code Title 5, Parks and Wildlife Proclamations 65.3 and 65.72	Commercial/recreational: bag limit - 1 shark/person/day; Commercial/recreational possession limit is twice the daily bag limit ( <i>i.e.</i> , 2 sharks/person/day); min size 24" TL for Atlantic sharpnose, blacktip, and bonnethead sharks and 64" TL for all other lawful sharks. Prohibited species: same as federal regulations	TX Parks & Wildlife Department Mark Lingo Phone: 956/350-4490 Fax: 956/350-3470
Puerto Rico	Regulation #6768  Article 8 – General Fishing Limits  Article 13 – Limitations  Article 17 – Permits for Recreational Fishing  (March 2004)	Swordfish or billfish, tuna and shark are covered under the federal regulation known as Highly Migratory Species of the United States Department of Commerce (50 CFR, Part 635); Fishers who capture these species shall comply with said regulation; Billfish captured incidentally with long line must be released by cutting the line close to the fishhook, avoiding the removal of the fish from the water; In the case of tuna and swordfish, fishers shall obtain a permit according to the requirements of the federal government.	Puerto Rico Department of Natural and Environmental Resources Craig Lilyestrom Phone: 787-999-2200 x2689 Fax: 787-999-2271
U.S. Virgin Islands	US VI Commercial and Recreational Fisher's Information Booklet Revised June 2004	Federal regulations and federal permit requirements apply in territorial waters.	<a href="http://www.caribbeanfmc.com">www.caribbeanfmc.com</a>  <a href="http://www.caribbeanfmc.com/usvi%20booklet/fisher%20booklet%20final.pdf">http://www.caribbeanfmc.com/usvi%20booklet/fisher%20booklet%20final.pdf</a>

### 3.2 Status of the Stocks

The thresholds used to determine the status of Atlantic HMS, including sharks, are fully described in Chapter 3 of the 1999 FMP and Amendment 1 to the Billfish FMP, Chapter 3 of the 2006 Consolidated HMS FMP, and are presented in Figure 3.1. These thresholds are based on the thresholds described in a paper describing the technical guidance for implementing NSG1 of the Magnuson-Stevens Act (Restrepo *et al.*, 1998).

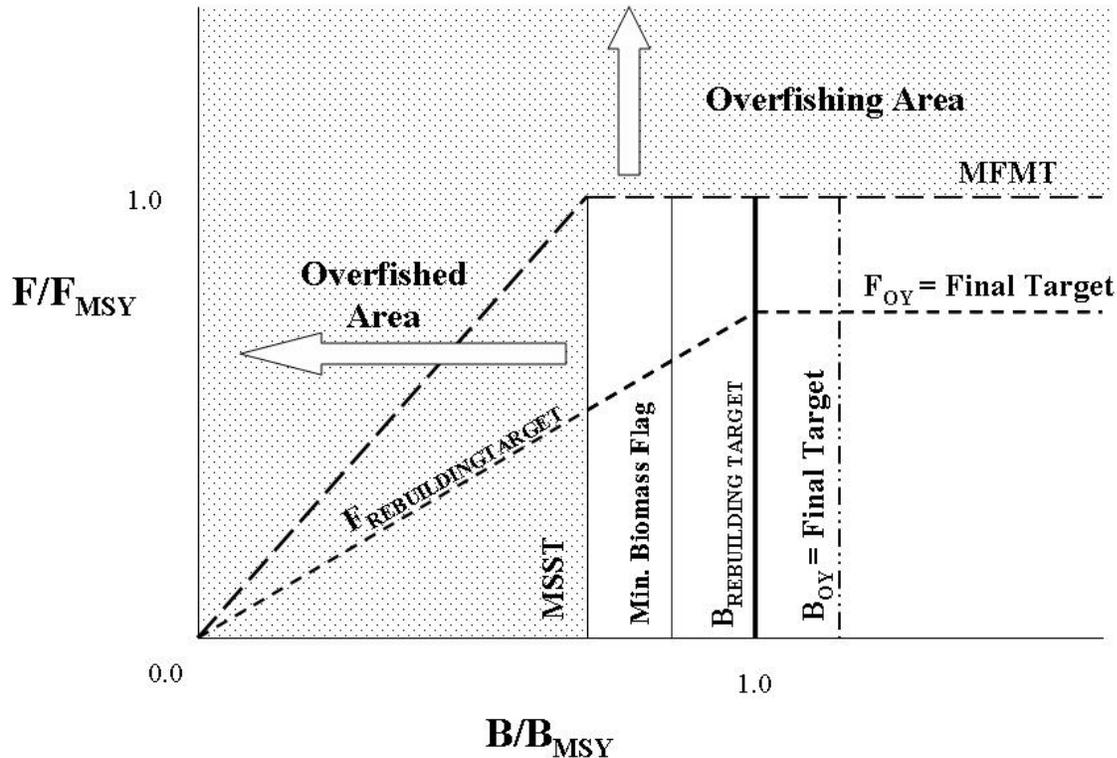


Figure 3.1 Illustration of the status determination and rebuilding terms.

In summary, a species is considered overfished when the current biomass ( $B$ ) is less than the minimum stock size threshold ( $B < B_{MSST}$ ). The minimum stock size threshold ( $MSST$ ) is determined based on the natural mortality of the stock and the biomass at  $MSY$  ( $B_{MSY}$ ).  $MSY$  is the maximum long-term average yield that can be produced by a stock on a continuing basis. The biomass can be lower than  $B_{MSY}$ , and the stock not be declared overfished as long as the biomass is above  $B_{MSST}$ .

Overfishing may be occurring on a species if the current fishing mortality ( $F$ ) is greater than the fishing mortality at  $MSY$  ( $F_{MSY}$ ) ( $F > F_{MSY}$ ). In the case of  $F$ , the maximum fishing mortality threshold is  $F_{MSY}$ . Thus, if  $F$  exceeds  $F_{MSY}$ , the stock is experiencing overfishing.

If a species is declared overfished or overfishing is occurring, action to rebuild the stock and/or prevent further overfishing is required by law. A species is considered rebuilt when  $B$  is greater than  $B_{MSY}$  and  $F$  is less than  $F_{MSY}$ . A species is considered healthy when  $B$  is greater

than or equal to the biomass at optimum yield ( $B_{OY}$ ) and  $F$  is less than or equal to the fishing mortality at optimum yield ( $F_{OY}$ ).

In summary, the thresholds to use to calculate the status of Atlantic HMS, as described in the 1999 FMP and 2006 Consolidated HMS FMP, are:

- Maximum Fishing Mortality Threshold (MFMT) =  $F_{limit} = F_{MSY}$ ;
- Overfishing is occurring when  $F_{year} > F_{MSY}$ ;
- Minimum Stock Size Threshold (MSST) =  $B_{limit} = (1-M)B_{MSY}$  when  $M < 0.5 = 0.5B_{MSY}$  when  $M \geq 0.5$ ;
- Overfished when  $B_{year}/B_{MSY} < MSST$ ;
- Biomass target during rebuilding =  $B_{MSY}$ ;
- Fishing mortality during rebuilding  $< F_{MSY}$ ;
- Fishing mortality for healthy stocks =  $0.75F_{MSY}$ ;
- Biomass for healthy stocks =  $B_{OY} = \sim 1.25$  to  $1.30B_{MSY}$ ;
- Minimum biomass flag =  $(1-M)B_{OY}$ ; and
- Level of certainty of *at least* 50 percent but depends on species and circumstances; for sharks, a level of certainty of 70 percent is used as a guide.
- For sharks, in some cases, spawning stock fecundity (SSF) or spawning stock number (SSN) was used as a proxy for biomass since biomass does not influence pup production in sharks.

In this amendment, NMFS is also implementing a mechanism to establish ACLs and AMs for Atlantic shark fisheries. This mechanism can be found in Chapter 1.

### **3.2.1 Atlantic Sharks**

#### **3.2.1.1 Life History/Species Biology**

Sharks belong to the class Chondrichthyes (cartilaginous fishes) that also includes rays, skates, and deepwater chimaeras (ratfishes). From an evolutionary perspective, sharks are an old group of fishes characterized by skeletons lacking true bones. The earliest known sharks have been identified from fossils from the Devonian period, over 400 million years ago. These primitive sharks were small creatures, about 60 to 100 cm long, that were preyed upon by larger armored fishes that dominated the seas. The life span of all shark species in the wild is not known, but it is believed that many species may live 30 to 40 years or longer.

Relative to other marine fish, sharks have a very low reproductive potential. Several important commercial species, including large coastal carcharhinids, such as sandbar (Casey and Hoey, 1985; Sminkey and Musick, 1995; Heist *et al.*, 1995), lemon (Brown and Gruber, 1988), and bull sharks (*Carcharhinus leucas*) (Branstetter and Stiles, 1987), do not reach maturity until 12 to 18 years of age. Various factors determine this low reproductive rate: slow growth, late

sexual maturity, one to two-year reproductive cycles, a small number of young per brood, and specific requirements for nursery areas. These biological factors leave many species of sharks vulnerable to overfishing.

There is extreme diversity among the approximately 350 species of sharks, ranging from tiny pygmy sharks of only 20 cm (7.8 in) in length to the giant whale sharks, over 12 meters (39 feet) in length. There are fast-moving, streamlined species such as mako (*Isurus* spp.) and thresher sharks (*Alopias* spp.), and sharks with flattened, ray-like bodies, such as Atlantic angel sharks (*Squatina dumerili*). The most commonly known sharks are large apex predators including the white (*Carcharodon carcharias*), shortfin mako, tiger, bull, and great hammerhead. Some shark species reproduce by laying eggs, while others nourish their embryos through a placenta. Despite their diversity in size, feeding habits, behavior and reproduction, many of these adaptations have contributed greatly to the evolutionary success of sharks.

The most significant reproductive adaptations of sharks are internal fertilization and the production of fully developed young or “pups.” These pups are large at birth, effectively reducing the number of potential predators and enhancing their chances of survival. During mating, the male shark inseminates the female with copulatory organs, known as claspers, which originate on the pelvic fins. In most species, the embryos spend their entire developmental period protected within their mother’s body, although some species lay external eggs. The number of young produced by most shark species in each litter is small, usually ranging from two to 25, although large females of some species can produce litters of 100 or more pups. The production of fully-developed pups requires great amounts of nutrients to nourish the developing embryo. Traditionally, these adaptations have been grouped into three modes of reproduction: oviparity (eggs hatch outside body), ovoviviparity (eggs hatch inside body), and viviparity (live birth).

Adults usually congregate in specific areas to mate and females generally travel to specific nursery areas to pup. These nurseries are discrete geographic areas, usually in waters shallower than those inhabited by the adults. Frequently, the nursery areas are in highly productive coastal or estuarine waters where abundant small fishes and crustaceans provide food for the growing pups. These areas also may have fewer large predators, thus enhancing the chances of survival of the young sharks. In temperate zones, the young leave the nursery with the onset of winter. In tropical areas, young sharks may stay in the nursery area for a few years.

Shark habitat can be described in four broad categories: (1) coastal, (2) pelagic, (3) coastal-pelagic, and (4) deep-dwelling. Coastal species inhabit estuaries, the nearshore and waters of the continental shelves, *e.g.*, blacktip, finetooth, bull, lemon, and Atlantic sharpnose sharks. Pelagic species, on the other hand, range widely in the upper zones of the oceans, often traveling over entire ocean basins. Examples include shortfin mako, blue, and oceanic whitetip sharks. Coastal-pelagic species are intermediate in that they occur both inshore and beyond the continental shelves, but have not demonstrated mid-ocean or transoceanic movements. Sandbar sharks are examples of a coastal-pelagic species. Deep-dwelling species, *e.g.*, most cat sharks (*Apristurus* spp.) and gulper sharks (*Centrophorus* spp.) inhabit the dark, cold waters of the continental slopes and deeper waters of the ocean basins.

Seventy-three species of sharks are known to inhabit the waters along the U.S. Atlantic coast, including the Gulf of Mexico and the waters around Puerto Rico and the U.S. Virgin Islands. Thirty-nine species are managed by HMS; spiny dogfish also occur along the U.S. coast, however management for this species is currently provided by the ASMFC as well as the New England and Mid-Atlantic Fishery Management Councils. Deep-water sharks were removed from the management unit in 2003. Based on the ecology and fishery dynamics, shark species have previously been divided into four species complexes for management purposes: (1) LCS, (2) SCS, (3) pelagic sharks, and (4) prohibited species (Table 3.2). As a result of Amendment 2 to the HMS FMP, sandbar sharks can only be taken commercially within a shark research fishery. In addition, sandbar and silky sharks can not be retained by recreational anglers.

**Table 3.2 Common names of shark species included within the four species management units under Amendment 2 to the Consolidated HMS FMP.**

Management Unit	Shark Species Included
LCS (11)	Sandbar*, silky*, tiger, blacktip, bull, spinner, lemon, nurse, smooth hammerhead, scalloped hammerhead, and great hammerhead sharks
SCS (4)	Atlantic sharpnose, blacknose, finetooth, and bonnethead sharks
Pelagic Sharks (5)	Shortfin mako, thresher, oceanic whitetip, porbeagle, and blue sharks
Prohibited Species (19)	Whale, basking, sand tiger, bigeye sand tiger, white, dusky, night, bignose, Galapagos, Caribbean reef, narrowtooth, longfin mako, bigeye thresher, sevengill, sixgill, bigeye sixgill, Caribbean sharpnose, smalltail, and Atlantic angel sharks
* Sandbar and silky sharks cannot be retained by recreational fishermen; sandbar sharks can only be retained by commercial fishermen under specific circumstances.	

### 3.2.1.2 Stock Status and Outlook

NMFS is responsible for conducting stock assessments for the LCS and SCS complexes (Cortés, 2002; Cortés *et al.*, 2002). ICCAT’s SCRS conducted stocks assessments for blue sharks and shortfin mako in 2008. A summary of the shortfin mako shark stock assessment is included in this section. Ecological risk assessments (ERAs) were also conducted by the SCRS for eight additional priority species of sharks (longfin mako (*Isurus paucus*); bigeye thresher; common thresher; oceanic whitetip; silky; porbeagle; scalloped hammerhead; and smooth hammerhead. Stock assessments were conducted for the LCS complex, sandbar sharks, and blacktip sharks in 2006 (NMFS, 2006a), and details of these assessments can be found in Amendment 2 to the 2006 Consolidated HMS FMP. NMFS also recently released a stock assessment for dusky sharks (May 25, 2006, 71 FR 30123) (Cortés *et al.*, 2006).

A SCS stock assessment was finalized during the summer of 2007 (NMFS, 2007a), which also assessed finetooth, Atlantic sharpnose, blacknose, and bonnethead sharks separately. Based on this SCS assessment, NMFS has determined that blacknose sharks are overfished with overfishing occurring (May 7, 2008, 73 FR 25665). Based on the latest SCRS assessment,

NMFS has determined that shortfin mako sharks are experiencing overfishing. NMFS is proposing in Amendment 3 to develop management measures to rebuild blacknose sharks and end overfishing for blacknose shark and shortfin mako sharks.

### ***3.2.1.3 Small Coastal Sharks***

On November 13, 2007, NMFS completed a SCS stock assessment following the SEDAR process (72 FR 63888). The SCS Data Workshop was held February 5-9, 2007 (December 7, 2006, 71 FR 70965). The SCS Assessment workshop was held May 7-11, 2007 (April 19, 2007, 72 FR 19701), and the SCS Review workshop was held on August 6-10, 2007 (July 19, 2007, 72 FR 39606). The assessment reviewed data and models for the SCS complex and for each individual species within the SCS complex, per recommendations in previous assessments. This allowed individual analyses, discussions, and stock status determinations for five separate assessments: 1) SCS complex, 2) Atlantic sharpnose shark, 3) bonnethead shark, 4) blacknose shark, and 5) finetooth sharks. These assessments are included in one report as many of the indices, data, and issues overlap among assessments. The Review Panel found that the data and methods used were appropriate and the best available; however, the panel recommended using the individual assessments for each species rather than the assessment on the SCS complex as a whole. The Review Panel also endorsed recommendations for future research contained in the Data Assessment workshop reports, added additional recommendations, and provided comments on the SEDAR process to consider in the future. Based on these assessments, NMFS determined that blacknose sharks are overfished with overfishing occurring; however, Atlantic sharpnose, bonnethead, and finetooth sharks are not overfished and overfishing is not occurring (May 7, 2008, 73 FR 25665)

#### *SCS complex*

According to the 2007 the SCS stock assessment, the SCS complex is not overfished and overfishing is not occurring (May 7, 2008, 73 FR 25665). The peer reviewed assessment provides an update from the 2002 stock assessment on the status of SCS stocks and projects future abundance under a variety of catch levels in the U.S. Atlantic Ocean, Gulf of Mexico, and Caribbean Sea. Because the species were individually assessed, the peer reviewers recommended using species-specific results rather than on the aggregated SCS complex results. As a result of this recommendation, and because the stock assessment covered all SCS species, NMFS will no longer provide status updates or determinations on the SCS complex as a whole.

#### *Atlantic sharpnose*

The 2002 SCS stock assessment found that Atlantic sharpnose sharks were not overfished and overfishing was not occurring. The 2007 assessment for Atlantic sharpnose sharks also indicated that the stock is not overfished ( $SSF_{2005}/SSF_{MSY} = 1.47$ ) and that no overfishing is occurring ( $F_{2005}/F_{MSY} = 0.74$ ) (Table 3.3). Based on these results, NMFS has determined that Atlantic sharpnose sharks are not overfished with no overfishing occurring (May 7, 2008, 73 FR 25665). However, because estimates of fishing mortality from the assessment indicate that fishing mortality is close to, but presently below,  $F_{MSY}$  (*i.e.*, overfishing is not occurring), the peer reviewers suggest setting a threshold for fishing mortality to keep it below the  $F_{MSY}$  threshold to prevent overfishing in the future.

### *Bonnethead Sharks*

Based on the bonnethead stock assessment, the peer reviewers determined that bonnethead sharks are not overfished ( $SSF_{2005}/SSF_{MSY} = 1.13$ ). In addition, the estimate of fishing mortality rate in 2005 was less than  $F_{MSY}$ , ( $F_{2005}/F_{MSY} = 0.61$ ) (Table 3.3), thus overfishing was not occurring. As a result, NMFS has determined that bonnethead sharks are not overfished and no overfishing is occurring (May 7, 2008, 73 FR 25665). In addition, the assessment showed that there had been years of overfishing, and the main contributor of population mortality is the recreational fleet and the commercial gillnet fleet.

### *Blacknose Sharks*

The 2002 assessment found blacknose sharks were not overfished and overfishing was not occurring. However, the 2007 assessment for blacknose shark indicates that spawning stock fecundity (SSF; *i.e.*, the number of reproductive-age individuals in a population) in 2005 and during 2001-2005 was smaller than  $SSF_{MSY}$  ( $SSF_{2005}/SSF_{MSY} = 0.48$ ). Therefore, NMFS has determined that blacknose sharks are overfished. In addition, the estimate of fishing mortality in 2005 and the average from 2001-2005 was greater than  $F_{MSY}$ , and the ratio was substantially greater than 1 in both cases ( $F_{2005}/F_{MSY} = 3.77$ ). Based on these results, NMFS has determined that blacknose sharks are experiencing overfishing (May 7, 2008, 73 FR 25665). The assessment recommended a rebuilding plan with 70 percent probability of recovering to  $SSF_{MSY}$  by 2019 if  $F=0$ . This recommended rebuilding time is 11 years from 2009. A constant TAC of 19,200 individuals would lead to rebuilding with 70 percent probability by 2027. The constant TAC also allows for rebuilding with 50 percent confidence by 2024. The assessment found that the majority of the mortality for blacknose sharks was occurring as bycatch in the Gulf of Mexico shrimp trawl fishery. In addition, the majority of mortality was occurring on juvenile and neonate blacknose sharks. Blacknose sharks mature around 91 cm total length and around 4.5 years of age.

### *Finetooth Sharks*

According to the 2007 finetooth shark stock assessment, finetooth sharks are not overfished ( $N_{2005}/N_{MSY} = 1.80$ ) and overfishing is not occurring ( $F_{2005}/F_{MSY} = 0.17$ ) (May 7, 2008, 73 FR 25665). This is a change from the 2002 assessment in which finetooth sharks were determined to be experiencing overfishing. However, NMFS also notes that while the peer reviewers agreed that it is reasonable to conclude that the stock is not currently overfished, they also indicated that given the limited data available on the population dynamics for finetooth, management should be cautious. Unlike the other SCS, where the bulk of the mortality occurs in shrimp trawl gear, the majority of the mortality for finetooth sharks occur in gillnets.

**Table 3.3 Summary Table of Biomass and Fishing Mortality for Small Coastal Sharks (SCS) and Shortfin Mako Sharks.**  
 Source: NMFS, 2007a, SCRS 2008a.

Species	Current Relative Biomass Level	Current Biomass $N_{2005}$	Stock Abundance $N_{MSY}$	Minimum Stock Size Threshold (MSST)	Current Relative Fishing Mortality Rate $(F_{2005}/F_{MSY})$	Maximum Fishing Mortality Threshold	Outlook
Small Coastal Sharks (SCS)	1.69 $(N_{2005}/N_{MSY})$	5.16E+07	2.98E+07	2.1E+07	0.25	0.09	Not overfished; No overfishing is occurring
Bonnethead Sharks	1.13 $(SSF_{2005}/SSF_{MSY})$	1.59E+06	1.92E+06	1.4E+06	0.61	0.31	Not overfished; No overfishing is occurring
Atlantic Sharpnose Sharks	1.47 $(SSF_{2005}/SSF_{MSY})$	5.96E+06	4.45E+06	4.09E+06	0.74	0.19	Not overfished; No overfishing is occurring
Blacknose Sharks	0.48 $(SSF_{2005}/SSF_{MSY})$	3.49E+05	5.7E+05	4.3E+05	3.77	0.07	Overfished; Overfishing is occurring
Finetooth Sharks	1.80 $(N_{2005}/N_{MSY})$	6.00E+06	3.20E+06	2.4E+06	0.17	0.03	Not overfished; No overfishing is occurring
Shortfin Mako Sharks	$B_{2007}/B_{MSY} = 0.95-1.65$	<i>Not reported</i>	<i>Not reported</i>	<i>Unknown</i>	$F_{2007}/F_{MSY} = 0.48-3.77$	0.007-0.05	Not overfished (approaching overfished); overfishing is occurring

### 3.2.1.4 Pelagic Sharks

Pelagic sharks are subject to exploitation by many different nations and exhibit trans-oceanic migration patterns. As a result, ICCAT's SCRS Subcommittee on Bycatch has recommended that ICCAT take the lead in conducting stock assessments for pelagic sharks.

An ecological risk assessment (ERA) conducted by the SCRS for eleven priority species of elasmobranchs (including blue shark and shortfin mako) caught in ICCAT fisheries, demonstrated that most Atlantic pelagic sharks have exceptionally limited biological productivity and, as such, can be overfished even at very low levels of fishing mortality. Specifically, the analyses indicated that bigeye threshers, longfin makos, and shortfin makos have the highest vulnerability (and lowest biological productivity) of the shark species examined (with bigeye thresher being substantially less productive than the other species). All species considered in the ERA, particularly smooth hammerhead, longfin mako, bigeye thresher and crocodile sharks (*Pseudocarcharias kamoharai*), are in need of improved biological data to evaluate their biological productivity more accurately and thus specific research projects should be supported to that end. The SCRS recommended that ERAs be updated with improved information on the productivity and susceptibility of these species.

#### *2008 ICCAT Shark Stock Assessment*

In 2008, an updated stock assessment for blue and shortfin mako sharks was conducted by ICCAT's SCRS. The SCRS determined that while the quantity and quality of the data available for use in the stock assessment had improved since the 2004 assessment, they were still uninformative and did not provide a consistent signal to inform the models used in the 2008 assessment. The SCRS noted that if these data issues could not be resolved in the future, their ability to determine stock status for these and other species will continue to be uncertain. The SCRS assessed blue and shortfin mako sharks as three different stocks, North Atlantic, South Atlantic, and Mediterranean. However, the Mediterranean data was considered insufficient to conduct the quantitative assessments for these species.

#### *Shortfin Mako Sharks*

The estimates of stock status for the North Atlantic shortfin mako shark were much more variable than for blue sharks. For the North Atlantic, multiple model outcomes indicated stock depletion to be about 50 percent of virgin biomass (1950s levels) and levels of  $F$  above those resulting in MSY, whereas other models estimated considerably lower levels of depletion and no overfishing. The SCRS determined that there is a "non-negligible probability" that the North Atlantic shortfin mako stock could be below the biomass that could support MSY ( $B_{2007}/B_{msy} = 0.95-1.65$ ) and above the fishing mortality rate associated with MSY ( $F_{2007}/F_{msy} = 0.48-3.77$ ) (Table 3.3). Similar outcomes were determined by the SCRS from the 2004 assessment; however, recent biological data show decreased productivity for this species. NMFS believes this to be the best available scientific information with respect to shortfin mako stock status. Therefore, given the results of this assessment, NMFS has determined that North Atlantic shortfin mako is not overfished, but is approaching an overfished status and is experiencing overfishing.

### **3.2.1.5 Recent and Ongoing Research**

NMFS continuously engages in shark research to better understand their biology, ecology, and behavior. This research helps to improve our understanding of sharks and enables NMFS to make better management decisions. Please see the 2008 and 2009 SAFE Reports on Atlantic HMS for information on recent and ongoing research.

### **3.3 Habitat Types and Distributions**

Sharks may be found in large expanses of the world's oceans, straddling jurisdictional boundaries. Although many of the species frequent other oceans of the world, the Magnuson-Stevens Act only authorizes the description and identification of EFH in federal, state or territorial waters, including areas of the U.S. Caribbean, the Gulf of Mexico, and the Atlantic coast of the United States to the seaward limit of the EEZ. For a detailed description of shark coastal and estuarine habitat, continental shelf and slope area habitat, and pelagic habitat for the Atlantic, Gulf of Mexico, and U.S. Caribbean, please refer to Section 3.3.2 of the 2006 Consolidated HMS FMP and Amendment 1 to the 2006 Consolidated HMS FMP. For a description of smooth dogfish EFH, please refer to Chapter 11 of this document.

### **3.4 Fishery Data Update**

In this section, HMS fishery data are analyzed by gear type. While HMS fishermen generally target particular species, the non-selective nature of most fishing gears promote effective analysis and management on a gear-by-gear basis. In addition, issues such as bycatch and safety are generally better addressed by gear type.

The revised list of authorized fisheries and fishing gear used in those fisheries became effective December 1, 1999 (64 FR 67511). The rule applies to all U.S. marine fisheries, including Atlantic HMS. As stated in the rule, "no person or vessel may employ fishing gear or participate in a fishery in the exclusive economic zone (EEZ) not included in this List of Fisheries (LOF) without giving 90 days' advance notice to the appropriate Fishery Management Council (Council) or, with respect to Atlantic HMS, the Secretary of Commerce (Secretary)." Authorized gear types include:

- Swordfish handgear fishery – rod and reel, harpoon, handline, bandit gear, buoy gear;
- Swordfish recreational fishery - rod and reel, handline
- Pelagic longline fishery – longline
- Shark gillnet fishery – gillnet
- Shark bottom longline fishery – longline
- Shark handgear fishery - rod and reel, handline, bandit gear
- Shark recreational fishery – rod and reel, handline
- Tuna purse seine fishery – purse seine
- Tuna recreational fishery– rod and reel, handline, speargun (speargun allowed for tunas other than bluefin)

- Tuna handgear fishery – rod and reel, harpoon, handline, bandit gear, green-stick
- Atlantic billfish recreational fishery – rod and reel only

### **3.4.1 Bottom Longline**

#### ***3.4.1.1 Domestic History and Current Management***

The majority of commercially landed sharks are caught using BLL gear. However, the regulations for the shark fishery as discussed in this section apply to all gear types. In 1993, NMFS implemented the FMP for Sharks of the Atlantic Ocean, which established three management units: LCS, SCS, and pelagic sharks. At that time, NMFS identified LCS as overfished, and implemented commercial quotas for LCS and established recreational harvest limits for all sharks. In 2003, NMFS amended the measures enacted in the 1999 FMP based on the 2002 LCS and SCS stock assessments, litigation, and public comments. Implementing regulations for Amendment 1 to the 1999 FMP were published on December 24, 2003 (68 FR 74746). Management measures enacted in the amendment included: re-aggregating the large coastal shark complex, using MSY as a basis for setting commercial quotas, eliminating the commercial minimum size restrictions, establishing three regional commercial quotas (Gulf of Mexico, South Atlantic, and North Atlantic) for LCS and SCS management units, implementing trimester commercial fishing seasons effective January 1, 2005, imposing gear restrictions to reduce bycatch, and a time/area closure off the coast of North Carolina effective January 1, 2005. As a result of using MSY to establish quotas, and implementing a new rebuilding plan, the overall annual landings quota for LCS in 2004 was established at 1,017 metric tons (mt) dressed weight (dw). The overall annual landings quota for SCS was established at 454 mt dw and the pelagic, blue, and porbeagle shark quotas were established at 488 mt dw, 273 mt dw, and 92 mt dw, respectively.

The regional quotas which were established in Amendment 1 to the 1999 HMS FMP for LCS and SCS were intended to improve overall management of the stocks by tailoring quotas to specific regions based on landings information. These quotas were based upon average historical landings (1999 – 2001) from the canvass and quota monitoring databases. The canvass database provides a near-census of the landings at major dealers in the southeast United States (including state landings) and the quota monitoring database collects information from dealers in the South Atlantic and Gulf of Mexico.

On November 30, 2004, NMFS issued a final rule (69 FR 69537), which established, among other things, new regional quotas based on updated landings information from 1999 – 2003. This final rule did not change the overall quotas for LCS, SCS, and pelagic sharks established in Amendment 1 to the 1999 HMS FMP, but did revise the percentages allocated to each of the regions. The updated information was based on several different databases, including the canvass and quota monitoring databases, the Northeast Commercial Fisheries Database (CFDBS), and the snapper-grouper logbook. The new regional quotas and trimester seasons for the commercial Atlantic shark fishery became effective January 1, 2005.

Based on 2005 and 2006 stock assessments, NMFS further revised shark management measures and rebuilding periods in the final rule for Amendment 2 to the 2006 Consolidated

HMS FMP published on June 24, 2008 (73 FR 35778; corrected on July 15, 2008, 73 FR 40658). The final rule became effective on July 24, 2008. In the final rule, NMFS removed sandbar sharks from the LCS complex and established a non-sandbar LCS complex. In addition, NMFS established two regions for the non-sandbar LCS: an Atlantic and Gulf of Mexico region. NMFS also implemented new annual adjusted quotas for sandbar sharks (87.9 mt dw), non-sandbar LCS (Atlantic: 187.7 mt dw; Gulf of Mexico: 390.5 mt dw), and a porbeagle shark commercial quota (1.7 mt dw). The sandbar shark and non-sandbar LCS quotas would increase to their annual base quotas of 116.6 mt dw for sandbar sharks, 188.3 mt dw for non-sandbar LCS in the Atlantic region, and 439.5 mt dw for non-sandbar LCS in the Gulf of Mexico region as of January 1, 2013, depending on overharvests. NMFS maintained the annual SCS quota (454 mt dw), pelagic sharks quota (273 mt dw for blue sharks), and quota for pelagic sharks other than porbeagle and blue sharks (488 mt dw).

Commercial shark fishing effort is generally concentrated in the southeastern United States and Gulf of Mexico (Cortés and Neer, 2005). During 1997 – 2004, 92 – 99 percent of LCS, 37 – 49 percent of pelagic sharks, and nearly all SCS (80 – 100 percent) came from the southeast region (Cortés and Neer, 2005). McHugh and Murray (1997) found in a survey of shark fishery participants that the largest concentration of BLL fishing vessels is found along the central Gulf coast of Florida, with the John’s Pass - Madeira Beach area considered the center of directed shark fishing activities. Consistent with other HMS fisheries, some shark fishery participants move from their homeports to other fishing areas as the seasons change and fish stocks move.

Until Amendment 2 was implemented, the Atlantic BLL fishery targeted both LCS and SCS. Currently, BLL is still the primary commercial gear employed in the LCS and SCS fisheries in all regions although the trip limits implemented in Amendment 2 were designed, in part, to discourage fishermen from targeting LCS. Gear characteristics vary by region, but in general, an approximately ten-mile long BLL, containing about 600 hooks is fished overnight. Skates, sharks, or various fin fishes are used as bait. The gear typically consists of a heavy monofilament mainline with lighter weight monofilament gangions. Some fishermen may occasionally use a flexible 1/16 inch wire rope as gangion material or as a short leader above the hook.

#### ***3.4.1.2 Recent Catch and Landings Data***

The following section provides information on shark landings as reported in the shark BLL observer program. In January 2002, the observer coverage requirements in the shark BLL fishery changed from voluntary to mandatory participation if selected. At that time, NMFS selected approximately 40 - 50 vessels for observer coverage during each season. Vessels were randomly selected if they have a directed shark limited access permit, have reported landings from sharks during the previous year, and have not been selected for observer coverage during each of the three previous seasons.

The U.S. Atlantic commercial shark BLL fishery was monitored by the University of Florida and Florida Museum of Natural History, Commercial Shark Fishery Observer Program (CSFOP) from 1994 through the first season of 2005. In June 2005, responsibility for the observer program was transferred to the SEFSC’s Panama City Laboratory. The observer

program trains and places the observers aboard vessels in the directed shark BLL fishery in the Atlantic and Gulf of Mexico to collect data on the commercial shark fishery and thus improve overall management strategies for the fishery. Observers provide baseline characterization information, by region, on catch rates, species composition, catch disposition, relative abundance, and size composition within species for the LCS and SCS BLL fisheries.

During 2003, six observers logged 263 sea days on shark fishing trips aboard 20 vessels in the Atlantic from North Carolina to Florida and in the eastern Gulf of Mexico off Florida. The number of trips taken on each vessel ranged from one to five and the number of sea days each observer logged ranged from nine to 35. Observers documented the catches and fishing effort on approximately 150 longline sets that fished 103,351 hooks. During 2003, LCS comprised 68.4 percent of the total catch, and sandbar sharks were 30.6 percent of total LCS catch.

During 2004, five observers logged 196 sea days on 56 shark fishing trips aboard 11 vessels. Observers documented the catches and fishing effort during 120 longline sets that fished 90,980 hooks. In 2004 LCS comprised 66.7 percent of the total catch, and sandbar sharks were 26.6 percent of catch in 2004. Regional differences in sandbar shark abundance were evident. For example, in the Carolina region, sandbar sharks comprised 67.4 percent of the total catch and 77.2 percent of the LCS catch. In the Florida Gulf region, sandbar sharks comprised 62.0 percent of the total catch and 66.5 percent of the LCS catch, whereas in the Florida East Coast region, sandbar sharks comprised only 17.2 percent of the total observed catch, and 37.1 percent of the LCS catch (Burgess and Morgan, 2003). Blacktip sharks comprised 13.9 percent of total observed catch and 20.3 percent of the LCS catch (Burgess and Morgan, 2002). Tiger sharks comprised 7.5 percent of the total observed catch and 11.0 percent of the LCS catch. A majority of tiger sharks (71.7 percent) and nurse sharks (98.8 percent) were released alive.

From July 2005 through December 2006, five observers logged 89 trips on 37 vessels with a total of 211 hauls for the second and third seasons in the Atlantic from North Carolina to Florida and in the eastern Gulf of Mexico off Florida (Hale and Carlson, 2007). Observers documented the catches and fishing effort on 34 hauls on four trips targeting grouper/snapper or grouper/shark in the Gulf of Mexico, 82 hauls on 31 trips targeting shark in the Gulf of Mexico, 77 hauls on 50 trips targeting ships in the South Atlantic, and 18 hauls on four trips observed targeting tilefish in the South Atlantic.

From January to November 2007, the shark BLL observer program covered a total of 42 trips on 25 vessels with a total of 264 hauls. Gear characteristics of trips varied by area (Gulf of Mexico or the U.S. Atlantic Ocean) and target species (grouper/snapper or grouper/tilefish, shark or tilefish) (for more details, see Hale *et al.*, 2007). There were no grouper/snapper-targeted trips observed in the U.S. Atlantic Ocean. No trips were observed in the northern U.S. Atlantic Ocean. Observers documented the catches and fishing effort on 179 hauls and 10 trips targeting snapper/grouper or grouper/tilefish in the Gulf of Mexico. There were 24 hauls on 7 trips observed targeting sharks in the Gulf of Mexico. In the U.S. Atlantic Ocean, 39 hauls on 21 trips were observed targeting shark, and 22 hauls on three trips were observed targeting tilefish.

In 2007 on the trips targeting shark in the Gulf of Mexico, 1,302 individual animals were caught. This consisted of 94.9 percent sharks, 4.1 percent teleosts, 0.5 percent invertebrates, and

0.2 percent batoids. LCS comprised the greatest amount of shark catch, at 69.5 percent, and SCS comprised 30.3 percent. The prohibited dusky shark was also caught (0.1 percent). Red grouper was the most caught teleost, while blacktip sharks were the most commonly caught shark (Hale *et al.*, 2007).

In 2007 on the trips targeting grouper/snapper or grouper/tilefish in the Gulf of Mexico, 8,980 individual animals were caught. This consisted of 87.3 percent teleosts, 11.6 percent sharks, 0.2 percent batoids, and 0.8 percent invertebrates. LCS species comprised 16.5 percent of the shark catch, while SCS comprised the majority of the shark catch at 73.7 percent. Red grouper was the most caught teleost, and Atlantic sharpnose were the most caught sharks (Hale *et al.*, 2007).

On the trips targeting shark in the South Atlantic in 2007, 2,735 individual animals were caught. This consisted of 95.7 percent sharks, 2.5 percent teleosts, 1.2 percent batoids, and 0.4 percent invertebrates. Large coastal shark species comprised 78.7 percent of the shark catch while SCS species comprised 19.2 percent of the shark catch. Sandbar sharks and tiger sharks were the most commonly caught LCS. Other shark species caught were dusky sharks, sand tiger sharks, night sharks, and sixgill sharks. Great amberjack, almaco jack, and great barracuda were the most commonly caught teleosts (Hale *et al.*, 2007).

On the trips targeting tilefish in the South Atlantic in 2007, 1,293 individual animals were caught. This consisted of 97.2 percent teleosts, 2.5 percent sharks, and 0.2 percent invertebrates. LCS comprised 9.4 percent of the shark catch, while no SCS species were caught. Other shark species caught included the sevengill shark, shortfin mako shark, smooth dogfish and spiny dogfish (87.5 percent). Spiny dogfish was the most commonly caught shark species (75 percent) while tilefish was the most caught teleost at 97.5 percent (Hale *et al.*, 2007).

BLL for sharks has relatively low observed bycatch rates. For vessels targeting sharks in the Gulf of Mexico in 2007, four loggerhead turtles were observed caught in BLL gear. Of these, two were released alive, and two were released dead. For vessels targeting shark in the Atlantic, no loggerhead turtles were observed caught in BLL gear. However, three smalltooth sawfish were observed caught, with two being released alive and one released dead.

The final rule for Amendment 2 to the Consolidated HMS FMP (73 FR 35778, June 24, 2008, corrected at 73 FR 40658, July 15, 2008) established, among other things, a shark research fishery to maintain time series data for future stock assessments. The shark research fishery also allows selected commercial fishermen the opportunity to earn revenue from selling more sharks, including sandbar sharks, than fishermen operating outside the research fishery. Only the commercial shark fishermen selected to participate in the shark research fishery are authorized to land/harvest sandbars subject to the sandbar quota available each year. The selected shark research fishery permittees also have access to the non-sandbar LCS, SCS, and pelagic shark quotas. Commercial fishermen not participating in the shark research fishery may land non-sandbar LCS, SCS, and pelagic sharks subject to retention limits and quotas per 50 CFR 635.24 and 635.27, respectively.

In 2008, the shark BLL observer program covered a total of 50 trips on 17 vessels with a total of 214 hauls. Gear characteristics of trips varied by area (Gulf of Mexico or the U.S.

Atlantic Ocean) and target species (grouper/snapper or grouper/tilefish, shark or tilefish) (for more details, see Hale *et al.*, 2009). There were no grouper/snapper or grouper/tilefish targeted trips observed in the U.S. Atlantic Ocean. No trips were observed in the northern U.S. Atlantic Ocean. Observers documented the catches and fishing effort on 147 hauls and 7 trips targeting snapper/grouper or grouper/tilefish in the Gulf of Mexico. There were 41 hauls on 27 trips observed targeting sharks in the Gulf of Mexico. In the U.S. Atlantic Ocean, 26 hauls on 16 trips were observed targeting sharks.

In 2008 on the trips targeting shark in the Gulf of Mexico, 2,540 individual animals were caught. This consisted of 90.8 percent sharks, 7.7 percent teleosts, 0.8 percent invertebrates, and 0.6 percent batoids. LCS comprised the greatest amount of shark catch, at 75.3 percent, and SCS comprised 22.3 percent. The prohibited dusky shark, Caribbean reef shark, night shark, and white shark were also caught (1.0 percent) (Table 3.5). King snake eel was the most caught teleost (55.4 percent), and sandbar shark was the most commonly caught shark (16.6 percent) (Hale *et al.*, 2009).

In 2008, on the trips targeting grouper/snapper or grouper/tilefish in the Gulf of Mexico, 10,253 individual animals were caught. This consisted of 86.1 percent teleosts, 12.0 percent sharks, 1.8 percent invertebrates, and 0.04 percent batoids. Deep water shark species comprised the majority of the shark catch at 52.0 percent, followed by small coastal sharks (29.5 percent), large coastal sharks (10.4 percent) and pelagic sharks (0.1 percent). Yellowedge grouper was the most caught teleost, and smooth dogfish was the most caught shark (Hale *et al.*, 2009).

On the trips targeting shark in the South Atlantic in 2008, 1,836 individual animals were caught. This consisted of 99.1 percent sharks, 0.4 percent teleosts, 0.4 percent batoids, and 0.1 percent invertebrates. Large coastal shark species comprised 83.8 percent of the shark catch while SCS species comprised 16.1 percent and deep water sharks comprised 0.1 percent of the shark catch (Table 3.4). Tiger sharks were the most commonly caught shark (50.5 percent) and cobia were the most commonly caught teleost (28.6 percent) (Hale *et al.*, 2009).

BLL for sharks has relatively low observed bycatch rates. For vessels targeting sharks in the Gulf of Mexico in 2008, two smalltooth sawfish were observed caught in BLL gear and both were released alive. No other protected species interactions were observed in the Gulf of Mexico directed shark BLL fishery. For vessels targeting shark in the Atlantic, one loggerhead turtle was observed caught in BLL gear and ultimately released alive. No other protected species interactions were observed in the South Atlantic directed shark BLL fishery (Hale *et al.*, 2009).

### **3.4.1.3 Bottom Longline Bycatch**

Under the MMPA (16 U.S.C. 1361 *et seq.*) the Atlantic shark BLL is classified as Category III (remote likelihood or no known serious injuries or mortalities) (December 1, 2008; 73 FR 73032). As required by the Endangered Species Act (ESA), the NMFS Southeast Regional Office's Protected Resources Division prepared a Biological Opinion (BiOp) regarding the actions proposed under Amendment 2 to the 2006 Consolidated HMS FMP on May 20, 2008. The BiOp concluded, based on the best available scientific information, that Amendment 2 to the HMS FMP was not likely to jeopardize the continued existence of endangered green, leatherback, and Kemp's ridley sea turtles; the endangered smalltooth sawfish; or the threatened loggerhead

sea turtle. The actions implemented under Amendment 2 were not expected to jeopardize the continued existence of any endangered or threatened species. Furthermore, the BiOp concluded that the actions implemented under Amendment 2 were not likely to adversely affect any listed species of marine mammals, invertebrates (*i.e.*, listed species of coral) or other listed species of fishes (*i.e.*, Gulf sturgeon and Atlantic salmon) in the action area. For more information on the BiOp see the 2008 SAFE report.

The BiOp analyzed the effects of the commercial and recreational shark fisheries under Amendment 2 on sea turtles and smalltooth sawfish. These analyses recognized that the actions implemented under Amendment 2 would reduce shark fishing effort as a result of reduced quotas and retention limits (compared to 2004-2007 levels). These measures were expected to reduce the number of participants targeting sharks and should reduce impacts of BLL gear on endangered or threatened sea turtles. It also recognized that smalltooth sawfish interactions with BLL gear may also decline; however, since nearly all individuals are expected to survive interaction with this gear, the BiOp concludes that the actions implemented under Amendment 2 would have little effect on smalltooth sawfish mortality. Furthermore, the BiOp recognized that changes in shark strikenet effort under Amendment 2 were not likely to adversely affect sea turtle or smalltooth sawfish takes because very few takes occur as a result of gillnet practices prior to Amendment 2. The BiOp also stated that drift or sink gillnet sea turtle and smalltooth sawfish takes were more frequent compared to the strikenet fishery, but were still minimal compared to BLL fishing.

The BiOp recognized that implementing 100 percent observer coverage in the shark research fishery would allow observer reports to be used to monitor interactions of directed shark fishing in near real-time, which would improve monitoring and increase the sample size available for evaluating important sea turtle and smalltooth sawfish interaction characteristics (*e.g.*, average life stage and genetic origin data). This would improve data acquisition and monitoring of protected resource interactions in the shark BLL fishery. Maintaining current levels of observer coverage outside the shark research fishery would continue to allow NMFS to observe the non-research BLL and gillnet fishing activities by vessels with directed and incidental shark permits at a level that would allow for statistically reliable monitoring. This would provide a better understanding of the changing dynamics of this fishery and its impacts on all marine resources. Time/area closures being implemented consistent with the South Atlantic Fishery Management Council could provide additional protection for sea turtles and smalltooth sawfish within the marine protected areas; however, they were not likely to reduce the overall interactions between the fishery and protected species given their small size.

The BiOp indicated that the impacts of changes to seasons and regions on sea turtles and smalltooth sawfish interactions were unknown. The research fishery would likely create a more uniform distribution of effort. Thus, shark fishing effort might also occur at different times of the year. The quota and retention limit reductions would likely reduce interactions with protected species, regardless of any anticipated changes in effort patterns. Recreational measures were not expected to have any effect on sea turtles and smalltooth sawfish as there were no documented takes to indicate adverse effects on sea turtles, and only one documented take of a smalltooth sawfish using rod-and-reel to target sharks in federal waters prior to the implementation of Amendment 2.

The BiOp included a revised Incidental Take Statement (ITS) consistent with the modifications to the fishery implemented under Amendment 2. The Atlantic shark fishery had been managed under a 5-year ITS previously, but was modified to three years. A 3-year ITS was provided because the 5-year time period is too long for meaningful monitoring given the frequency of changes in management and the uncertainty of how effort by gear type will shift in response to the proposed action. The BiOp's 3-year approach would reduce the likelihood of requiring re-initiation unnecessarily because of inherent variability in take levels, but would still allow for an accurate assessment of how the fishery is performing. There were three Reasonable and Prudent Measures (RPMs) that have been implemented to minimize the impacts of the actions implemented under Amendment 2 on protected resources and Terms and Conditions for implementing the RPMs. The Agency has implemented the RPMs and adheres to the terms and conditions of the ITS to ensure compliance with the ESA.

Overall, the BiOp concluded in its evaluation of the effects of the actions implemented under Amendment 2 that the fishery's impacts on both sea turtles and smalltooth sawfish would decrease. Take of these species would continue but at a reduced level in the future because of reductions in fishing effort.

#### *Loggerhead Sea Turtles*

In the BLL fishery, a total of 80 sea turtles were observed caught from 1994 through 2008 (Table 3.6 and Table 3.7). Seasonal variation indicates that most of the sea turtles were caught early in the year. Of the 80 observed sea turtles, 65 were loggerhead sea turtles, of which 34 were released alive. Another 14 loggerheads were released in an unknown condition and 17 were released dead. Based on extrapolation of observer data, 784.3 loggerhead interactions with BLL gear occurred between 2004 and 2006. An additional 17.4 unidentified sea turtles were estimated to have been taken for this time period (NMFS, 2007b; Richards, 2007a). No extrapolation has been conducted for 2007 or 2008.

#### *Leatherback Sea Turtles*

Of the 80 observed sea turtle interactions in the BLL fishery from 1994 – 2008, six were leatherback sea turtles, of which one was dead and five were released with its condition unknown (Table 3.6 and Table 3.7). Based on extrapolated takes from observer data, it was estimated that 83.2 leatherback sea turtles were taken in the shark BLL fishery from 2004 through 2006 (NMFS, 2007b; Richards, 2007a). Given the large number of turtles released in an unknown condition, these estimated take numbers do not discriminate between live and dead releases. However, leatherback mortality is usually low because it is known that leatherbacks rarely ingest or bite hooks, but are usually foul hooked on their flippers or carapaces, reducing the likelihood of post-hooking release mortality. However, leatherback-specific data for this fishery is not available. No extrapolation has been conducted for 2007 or 2008.

#### *Smalltooth Sawfish*

As of April 1, 2003, NMFS listed smalltooth sawfish as an endangered species (68 FR 15674) under the ESA. After reviewing the best scientific and commercial information, the status review team determined that the continued existence of the U.S. Distinct Population

Segment of smalltooth sawfish was in danger of extinction throughout all or a significant portion of its range from a combination of the following four listing factors: the present or threatened destruction, modification, or curtailment of habitat or range; over-utilization for commercial, recreational, scientific, or educational purposes; inadequacy of existing regulatory mechanisms; and other natural or manmade factors affecting its continued existence. NMFS is in the process of designating critical habitat for smalltooth sawfish. A proposed rule regarding designation of critical habitat published on November 20, 2008 (73 FR 70290).

From 1994 through 2007, 15 smalltooth sawfish interactions have been observed (13 released alive, one released dead, and one released in unknown condition) in shark BLL fisheries (Morgan pers. comm.; Burgess and Morgan, 2004; Hale and Carlson, 2007; Hale *et al.*, 2007). In 2008, there were two observed smalltooth sawfish interactions with shark BLL gear (Hale *et al.*, 2009). Both interactions occurred in the Gulf of Mexico, and both smalltooth sawfish were released alive. Based on extrapolated takes for 2004 through 2006, 60 smalltooth sawfish have taken in the BLL fisheries (NMFS, 2007b; Richards, 2007a). No mortalities were extrapolated based on the overall extrapolated takes from 2004 to 2006; however, one known mortality occurred in 2007. NMFS has not calculated the extrapolated takes since the mortality occurred in 2007.

#### *Marine Mammals*

Four delphinids have been observed caught and released alive between 1994 and 2007, and one bottlenose dolphin was observed dead in 2003 (G. Burgess, pers. comm.; Hale and Carlson, 2007; Hale *et al.*, 2007). Based on this one dead encounter in 2003 (no interactions with marine mammals and BLL were observed in 2004 through 2008), NMFS extrapolated that a total of 100 bottlenose dolphin interactions could have occurred with BLL gear during 2003-2007 (Richards, 2007a).

#### *Seabirds*

Bycatch of seabirds in the shark BLL fishery is rare with a single pelican observed killed between 1994 and 2007 (G. Burgess, University of Florida, pers. com.). In 2008, observed seabird takes were 2 brown pelicans, one herring gull, and one unidentified seabird (Hale *et al.*, 2009). These birds were observed dead during BLL sets targeting grouper/snapper or grouper/shark mix in the Gulf of Mexico. No expanded estimates of seabird bycatch or catch rates are available for the BLL fishery.

**Table 3.4 Species composition of observed BLL catch during 2008 for BLL trips targeting sharks in the South Atlantic.**

Source: Hale *et al.*, 2009.

Species	Total Number Caught	% Total Catch	% Kept	% Discarded Dead	% Discarded Alive	% Unknown
Tiger shark	920	50.1	12.2	10.2	76.8	0.8
Sandbar shark	383	20.9	85.9	1.3	11.7	1
Atlantic sharpnose shark	290	15.8	94.1	5.5	0	0.3
Blacktip shark	148	8.1	80.4	15.5	3.4	0.7

Species	Total Number Caught	% Total Catch	% Kept	% Discarded Dead	% Discarded Alive	% Unknown
Great hammerhead shark	34	1.9	88.2	8.8	0	2.9
Bull shark	23	1.3	73.9	4.3	21.7	0
Nurse shark	13	0.7	0	0	100	0
Clearence skate	5	0.3	100	0	0	0
Blacknose shark	4	0.2	100	0	0	0
Lemon shark	3	0.2	66.7	0	33.3	0
Cobia	2	0.1	0	50	50	0
Remora	2	0.1	0	0	100	0
Southern stingray	2	0.1	0	0	100	0
Coral	1	0.1	0	0	0	100
Goliath grouper	1	0.1	0	0	100	0
Remora family	1	0.1	0	0	100	0
Sharks	1	0.1	0	100	0	0
Smooth dogfish	1	0.1	100	0	0	0
Warsaw grouper	1	0.1	100	0	0	0
<b>Total</b>	1835	100.0				

**Table 3.5** Species composition of observed BLL catch during 2008 for BLL trips targeting sharks in the Gulf of Mexico.

Source: Hale *et al.*, 2009.

Species	Total Number Caught	% Total Catch	% Kept	% Discarded Dead	% Discarded Alive	% Unknown
Sandbar shark	382	15.1	98.4	0.3	1	0.3
Atlantic sharpnose shark	327	12.9	83.2	15	0.6	1.2
Tiger shark	324	12.8	38.6	4.3	55.9	1.2
Bull shark	320	12.6	92.5	0.3	4.7	2.5
Blacktip shark	270	10.6	85.2	11.5	3	0.4
Nurse shark	241	9.5	10	0.8	89.2	0
Blacknose shark	177	7.0	83.1	15.3	1.7	0
King snake eel	108	4.3	100	0	0	0
Great hammerhead shark	69	2.7	94.2	1.4	2.9	1.4
Lemon shark	65	2.6	98.5	0	0	1.5
Scalloped hammerhead shark	38	1.5	92.1	2.6	2.6	2.6
Shortspine dogfish	28	1.1	32.1	17.9	50	0
Cubera snapper	20	0.8	90	0	0	10
Red grouper	19	0.7	78.9	15.8	5.3	0
Silky shark	19	0.7	89.5	5.3	5.3	0
Dusky shark	16	0.6	0	100	0	0
Mutton snapper	16	0.6	75	25	0	0
Southern stingray	13	0.5	7.7	0	92.3	0

Species	Total Number Caught	% Total Catch	% Kept	% Discarded Dead	% Discarded Alive	% Unknown
Molluscs	8	0.3	0	0	100	0
Yellowedge grouper	8	0.3	87.5	12.5	0	0
Bonnethead shark	7	0.3	57.1	42.9	0	0
Caribbean reef shark	7	0.3	71.4	28.6	0	0
Goliath grouper	7	0.3	0	0	100	0
Sponges	6	0.2	0	100	0	0
Gafftopsail catfish	4	0.2	25	75	0	0
Greater amberjack	4	0.2	75	0	25	0
Almaco jack	3	0.1	100	0	0	0
Coral	3	0.1	0	100	0	0
Shortfin mako shark	3	0.1	100	0	0	0
Spinner shark	3	0.1	66.7	0	33.3	0
Eels	2	0.1	50	0	50	0
Night shark	2	0.1	0	50	50	0
Requiem shark family	2	0.1	0	100	0	0
Snowy grouper	2	0.1	100	0	0	0
Bullnose ray	1	0.0	0	0	100	0
Cancer crabs	1	0.0	0	0	100	0
Clearnose skate	1	0.0	0	0	100	0
Finetooth shark	1	0.0	0	100	0	0
White shark	1	0.0	0	100	0	0
Octopus	1	0.0	0	0	100	0
Sea stars	1	0.0	0	0	100	0
Sharks	1	0.0	0	0	0	100
Smooth dogfish	1	0.0	0	100	0	0
Smooth hammerhead shark	1	0.0	100	0	0	0
Southern hake	1	0.0	0	100	0	0
Spiny dogfish	1	0.0	0	0	100	0
Spotted eagle ray	1	0.0	0	0	100	0
Warsaw grouper	1	0.0	100	0	0	0
Polychaete worms	1	0.0	0	0	100	0
<b>Total</b>	2538	100.0				

**Table 3.6 Total Number of Observed Sea Turtle Interactions by Species by Month for Years 1994-2008 in the Shark BLL Fishery.**

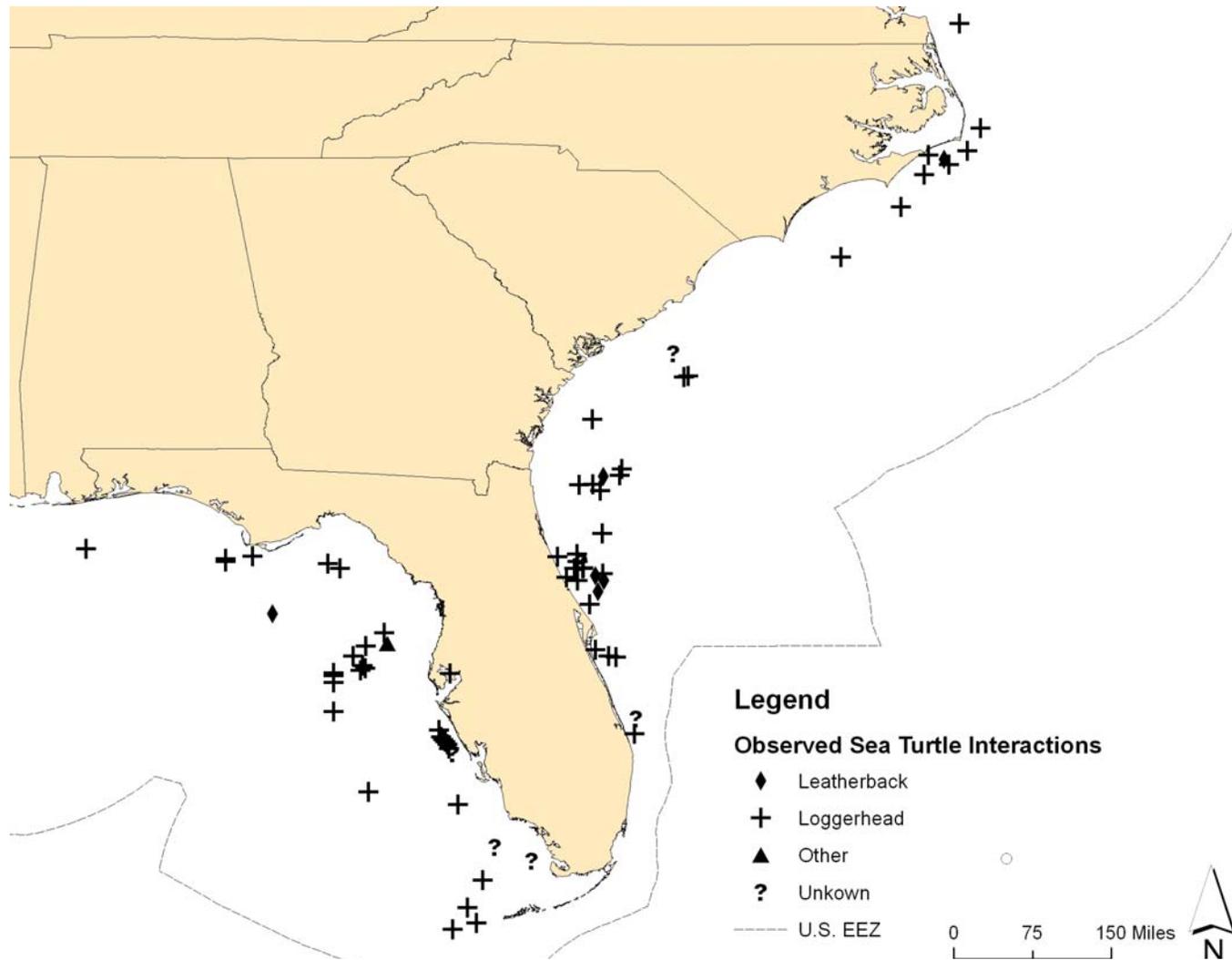
Source: Shark BLL Observer Program

Month	Leatherback Sea Turtle	Loggerhead Sea Turtle	Other Sea Turtles	Total
Jan	1	16	1	18
Feb	3	10	6	19
Mar		7		9
Apr		4		4
May	1			1
Jun				
July		18		18
Aug		4		4
Sept	1	3	1	5
Oct		2	1	3
Nov		1		1
Dec				
<b>Total</b>	6	65	9	80

**Table 3.7 Total number of Observed Sea Turtle Interactions by Year for Years 1994-2008 in the Shark BLL Fishery.**

Source: Shark BLL Observer Program. Letters in parentheses indicate whether the sea turtle was released alive (A), dead (D), or in an unknown (U) condition.

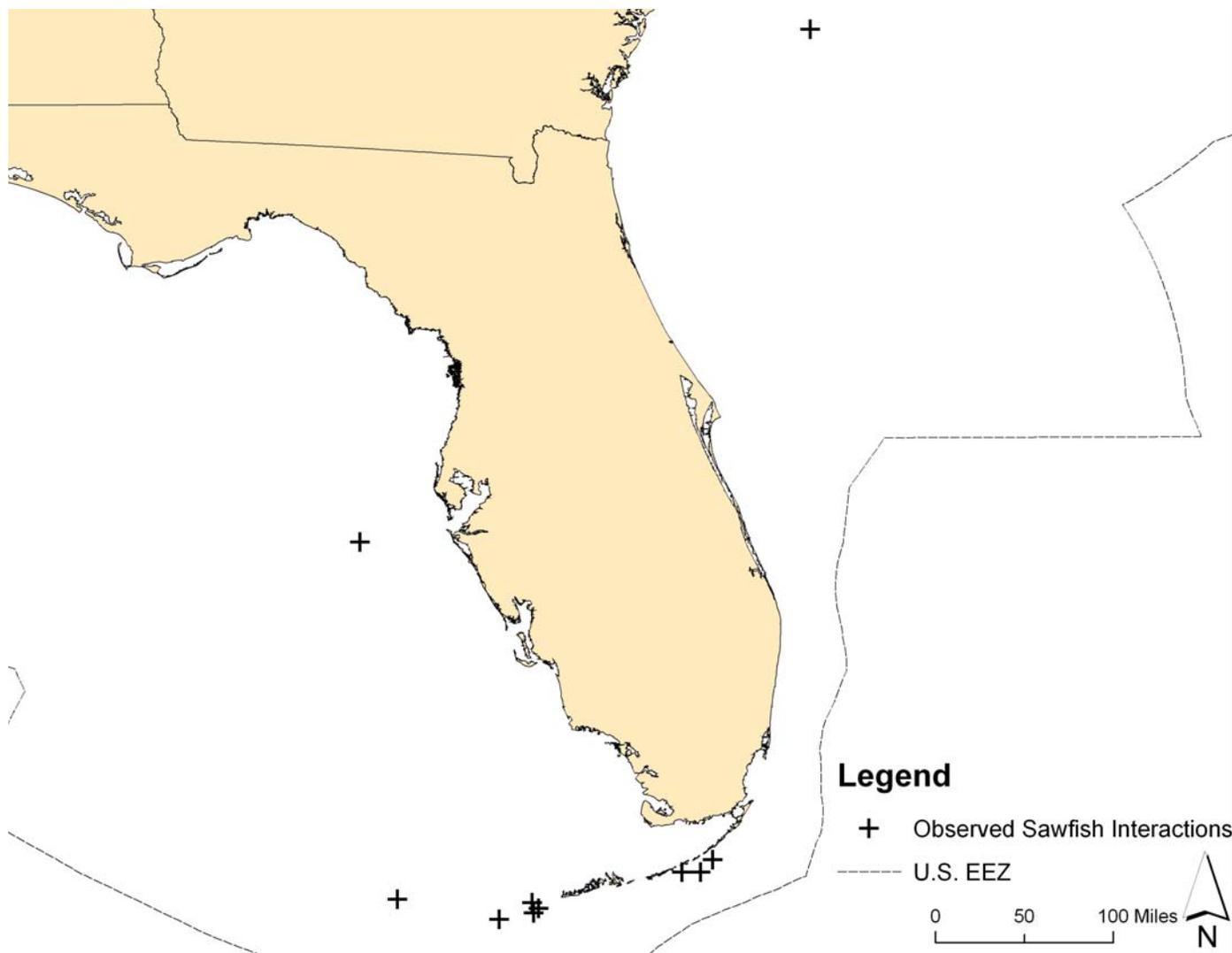
Year	Leatherback Sea Turtle	Loggerhead Sea Turtle	Other Sea Turtle	Total
1994	1 (1U)	5 (5U)	6 (6U)	12
1995		4 (3A, 1D)		4
1996	1 (1U)	6 (3A, 2D, 1U)		7
1997	1 (1U)	5 (3A, 2U)		6
1998		2 (1A, 1D)	1 (1A)	3
1999		2 (2A)		2
2001	1 (1D)	2 (2A)		3
2002		5 (3A, 1D, 1U)		5
2003		7 (6A, 1D)	1 (1U)	8
2004		5 (3A, 2D)		5
2005	2 (1A, 1D)	4 (1A, 3D)	1 (1U)	7
2006		12 (3A, 4D, 5U)		12
2007		5 (3A, 2D)		5
2008		1 (1A)		1
<b>Total</b>	6	65	9	80



**Figure 3.2**

**Observed sea turtle interactions in the shark BLL fishery from 1994-2008.**

Source: Commercial Shark Fishery Observer Program data (1994-1<sup>st</sup> season of 2005) and NMFS' Shark Observer Program data (2<sup>nd</sup> season 2005-2008).



**Figure 3.3** Observed sawfish interactions in the shark BLL fishery from 1994-2008.  
 Source: Commercial Shark Fishery Observer Program data (1994-1<sup>st</sup> season of 2005) and NMFS' Shark Observer Program data (2<sup>nd</sup> season 2005-2008).

## **3.4.2 Gillnet Fishery**

### ***3.4.2.1 Domestic History and Current Management***

The southeast shark gillnet fishery is comprised of several vessels based primarily out of ports in northern Florida (South Atlantic Region). These vessels use drift gillnet, strike gillnet, and sink gillnet gear. Set duration is generally 0.3 hours in depths averaging 20.9 m, and haulback averages 3.3 hours. The average time from setting the net through completion of haulback is 10.2 hours. Stretched mesh sizes measures from 12.7-25.4 cm (5 – 10 in). Strikenetters use the largest mesh size (22.9-30.4 cm; 9 – 12 in), and the set times are 3.2 hours, with nets approximately 364.8 m long and 30.4 m deep. Sink gillnets that are used to target sharks generally have a 7.3-20.3 cm (2.9 – 8 in) mesh size, and the process lasts for approximately 6.1 hours. This gear has also been observed while deployed to target non-HMS (teleosts). In those cases, sink gillnets use a stretched mesh size of 6.4-12.7 cm (2.5 – 5 in), and the entire process takes approximately 2.3 hours (Carlson and Bethea, 2007).

In 2001, NMFS established a requirement that fishermen conduct net checks every two hours to look for and remove any protected species. In 2007 the regulations implementing the Atlantic Large Whale Take Reduction Plan were amended, thus removing the requirement for 100 percent observer coverage for drift gillnet vessels during the right whale calving season and prohibiting all gillnets in an expanded southeast U.S. restricted area from Cape Canaveral, Florida to the North Carolina/South Carolina border during November 15 – April 15. The rule has limited exemptions, which allows shark strikenet fishing only in waters south of 29° N. latitude during this same period and for Spanish mackerel, *Scomberomorus maculates*, gillnet fishing in the months of December to March. Operations in this area during this time period require VMS and observer coverage, if selected. Based on these regulations, and on current funding levels, the shark gillnet observer program now covers all anchored (sink, stab, set), strike, or drift gillnets fishing by vessels that fish from Florida to North Carolina, year-round.

### ***3.4.2.2 Recent Catch and Landings***

Under the MMPA (16 U.S.C. 1361 *et seq.*) the Atlantic shark gillnet fishery is classified as Category II (occasional serious injuries and mortalities) (December 1, 2008; 73 FR 73032). The following section provides information on shark landings as reported in the shark gillnet observer program. The “Catch and Bycatch in U.S. Southeast Gillnet Fisheries, 2008” report described the gear and soak time deployed by drift gillnet, strike gillnet, and sink gillnet fishermen (Passerotti and Carlson, 2009).

#### *Gillnet Landings and Bycatch*

Strikenets - NMFS published a final rule (72 FR 34632, June 25, 2007) to reduce bycatch of right whales. It prohibits gillnet fishing or gillnet possession during periods associated with the right whale calving season. Limited exemptions to the fishing prohibitions are provided for gillnet fishing for sharks and for Spanish mackerel south of 29°00' N. lat. In this area, only gillnets used in a strikenet fashion can operate during day time when right whales are present. Operation in this area at that time requires VMS and observer coverage, if selected. Vessels

fishing in a strikenet fashion used nets 364.8 meters long, 30.4 meters deep, and with mesh size 22.9 cm.

The total observed strike gillnet catch consisted of eight species of sharks from 2005-2006. Finetooth and blacktip sharks made up the greatest percentage of catch in terms of total number caught in strike gillnets from 2005-2006 (Table 3.8). There were no strike gillnet trips observed in 2007, potentially due a first trimester closure of the LCS fishery. This closure was required because of 2006 landings in excess of the quota (Baremore *et al.*, 2007). Similarly, in 2008, no vessels were observed using strikenets to target sharks. This is likely due to the large coastal shark fishery closure in place during the first half of 2008, correcting for overages from the 2007 harvest (Passerotti and Carlson, 2009).

In the strikenet fishery from 2005-2006, 99.7 percent of the observed catch were sharks with only 0.15 percent teleosts, and 0.07 percent non-shark elasmobranchs. Blacktip, finetooth, and spinner shark comprised over 94 percent of the observed shark strike net catch by number and weight (Carlson and Bethea, 2007).

Drift Gillnets – In 2007, a total of five drift gillnet vessels were observed making 84 sets on 11 trips. Of those trips, there were 3 vessels observed that targeted sharks for a total of 4 trips and 4 hauls. The total observed catch composition for sets targeting sharks was 86.7 percent shark, 13.3 percent teleosts, zero percent non-shark elasmobranchs, and zero percent protected resources. Two species of sharks made up 98.1 percent of the observed shark catch: Atlantic sharpnose shark and blacknose shark. By weight, the shark catch was composed of Atlantic sharpnose, followed by scalloped hammerhead shark, blacknose shark, and blacktip shark. Three species of teleosts made up approximately 97 percent by number of the overall non-shark species. These species were little tunny, king mackerel (*Scomberomorus cavalla*), and barracudas (Baremore *et al.*, 2007).

In 2008, a total of five driftnet gillnet vessels were observed making 68 sets on 9 trips. The total observed catch composition for sets targeting sharks was 74.9 percent shark, 22.2 percent teleosts, 1.8 percent non-shark elasmobranchs, and zero percent protected resources. Two species of sharks made up 99.1 percent of the observed shark catch by number: smooth dogfish (87.2 percent) and spiny dogfish (11.8 percent) (Table 3.9). By weight, the shark catch was composed of smooth dogfish, followed by spiny dogfish, and Atlantic sharpnose. Five species of teleosts made up the majority of the non-shark catch, including: bluefish (*Pomatomus saltatrix*), Spanish mackerel (*Scomberomorus maculatus*), butterfish (*Peprilus triacanthus*), menhaden (*Brevoortia sp*) and king mackerel (*Scomberomorus cavalla*) (Passerotti and Carlson, 2009).

Sink Gillnets - Sinknet landings and bycatch vary by target species. A total of 29 trips making 112 sink net sets on six vessels were observed in 2007. Of those, 17 trips making 60 sets targeted sharks, 3 trips making 27 sets targeted Spanish mackerel, and 4 trips making 9 sets targeted Atlantic croaker (*Micropogonias undulates*), and 6 trips making 16 sets targeted other teleosts. Sink gillnets that targeted sharks caught 97.8 percent shark, 1.4 percent teleosts, 0.7 percent non-shark elasmobranchs, and 0.1 percent protected resources. By number, the shark catch was primarily bonnethead shark, finetooth shark, Atlantic sharpnose shark, and blacknose

shark. By weight the shark catch was made up of mostly finetooth shark, followed by bonnethead shark, blacknose shark, and spinner shark. Cobia (*Rachycentron canadum*) made up 25.8 percent of the teleost catch, followed by Gulf kingfish (*Menticirrhus littoralis*) and banded drum (*Larimus fasciatus*). Cownose ray (*Rhinoptera bonasus*) and Atlantic guitarfish (*Rhinobatos lentiginosus*) and other stingrays made up 100 percent of the non-shark elasmobranch catch (Baremore *et al.*, 2007).

Catch of vessels targeting Spanish mackerel was 99.4 teleosts and 0.6 percent shark. Shark catches were mostly Atlantic sharpnose by number, and blacktip and bonnethead sharks. By weight, spiny dogfish were the predominant catch, followed by smooth dogfish, blacktip shark, and bonnethead shark. Spanish mackerel, butterfish, and bluefish made up the majority of the catch (Baremore *et al.*, 2007).

Sink gillnet vessels targeting croaker caught 3.2 percent sharks, 96.7 percent teleosts, and 0.01 percent non-shark elasmobranchs. Sink gillnet vessels that targeted other species other than sharks, Spanish mackerel, and Atlantic croaker caught mostly bluefish and Atlantic croaker (Baremore *et al.*, 2007).

A total of 41 trips making 134 sink net sets on 14 vessels were observed in 2008. Target species included shark, Spanish mackerel, Southern kingfish (*Menticirrhus americanus*), and goosefish (monkfish) (*Lophius sp.*). Specific proportion breakdown of target species by trip was not possible in the 2008 data due to vessel confidentiality restrictions. Sink gillnets, regardless of target species, caught 86.0 percent teleosts, 12.0 percent sharks, 1.7 percent non-shark elasmobranchs, and zero percent protected resources. By number, the shark catch was primarily Atlantic sharpnose shark (45.3 percent), bonnethead shark (34.0 percent), blacknose shark (8.0 percent), and spinner shark (6.7 percent) (Table 3.10). By weight, the shark catch was made up of mostly Atlantic sharpnose shark, followed by bonnethead shark, blacknose shark and spinner shark, finetooth shark. Spanish mackerel made up 45.7 percent of the teleost catch, followed by bluefish, blue runner (*Caranx chrysos*), Atlantic bumper (*Chloroscombrus chrysurus*), and spot (*Leiostomus xanthurus*). Winter skate and Cownose ray made up the majority of the non-shark elasmobranch catch (Passerotti and Carlson, 2009).

### *Loggerhead Sea Turtles*

Loggerhead sea turtles are rarely caught in the shark gillnet fishery. No loggerheads were observed caught with strikenets during the 2000 – 2002 right whale calving seasons (Carlson, 2000; Carlson and Baremore, 2001; Carlson and Baremore, 2002a). However, three loggerhead sea turtles were observed caught with drift gillnets during right whale calving season, one each year from 2000 to 2002 (Carlson, 2000; Carlson and Baremore, 2001; Carlson and Baremore, 2002a; Garrison, 2003a). No loggerhead sea turtles were caught outside of the right whale calving season in 2002 (Carlson and Baremore, 2002b), and no loggerhead turtles were observed caught during or after the right whale calving season in 2003 or 2004 in the directed shark gillnet fishery (Carlson and Baremore, 2003; Carlson, pers. comm). In 2005, five loggerheads were observed caught, and in 2006, three loggerheads were observed caught (Table 3.11). In 2007, 4 loggerhead sea turtles were observed, three were released alive, and one was released in an unknown condition (Baremore *et al.*, 2007). There were no observed loggerhead sea turtle interactions in 2008 (Passerotti and Carlson, 2009).

### *Leatherback Sea Turtles*

In the shark gillnet fishery, leatherback sea turtles are sporadically caught. No leatherback sea turtles were observed caught with strikenets during the 2000 – 2002 right whale calving seasons (Carlson, 2000; Carlson and Baremore, 2001; Carlson and Baremore, 2002a). Leatherback sea turtles have been observed caught in shark drift gillnets, including 14 in 2001 and 2 in 2002 (Carlson, 2000; Carlson and Baremore, 2001; Carlson and Baremore, 2002a; Garrison, 2003a). NMFS temporarily closed the shark gillnet fishery (strikenetting was allowed) from March 9 to April 9, 2001, due to the increased number of leatherback interactions that year (66 FR 15045, March 15, 2001). From 2003 – 2004, no leatherback sea turtles were observed caught in gillnets fished in strikenet or driftnet methods (Carlson and Baremore, 2003; Carlson, pers. comm.). In 2005, one leatherback turtle was caught and released alive (Table 3.11). In 2006 and 2007, no leatherbacks were observed caught in gillnets (Carlson and Bethea, 2007; Baremore et al., 2007; Table 3.11). There were no observed leatherback sea turtle interactions in 2008 (Passerotti and Carlson, 2009).

### *Smalltooth Sawfish*

To date there has been only one observed catch of a smalltooth sawfish in shark gillnet fisheries. The sawfish was taken on June 25, 2003, in a gillnet off the west coast of Florida and was released alive (Carlson and Baremore, 2003). The sawfish was cut from the net and released alive with no visible injuries. This indicates that smalltooth sawfish can be removed safely if entangled gear is sacrificed. The set was characteristic of a typical drift gillnet set, with gear extending 30 to 40 feet deep in 50 to 60 feet of water. Prior to this event it was speculated that the depth at which drift gillnets are set above the sea floor may preclude smalltooth sawfish from being caught. From 2004-2008, there were no observed catches of smalltooth sawfish in shark gillnet fisheries.

Although sometimes described as a lethargic demersal species, smalltooth sawfish feed mostly on schooling fish, thus they would occur higher in the water column during feeding activity. In fact, smalltooth sawfish and Atlantic sharks may be attracted to the same schools of fish, potentially making smalltooth sawfish quite vulnerable if present in the area fished. The previous absence of smalltooth sawfish incidental capture records is more likely attributed to the relatively low effort in this fishery and the rarity of smalltooth sawfish, especially in federal waters. These factors may result in little overlap of the species with the gear.

Given the high rate of observer coverage in the shark gillnet fishery, NMFS believes that smalltooth sawfish takes in this fishery are very rare. The fact that there were no smalltooth sawfish caught during 2001 when 100 percent of the fishing effort was observed indicates that smalltooth sawfish takes (observed or total) most likely do not occur on an annual basis. Based on this information, the 2008 BiOp permitted one incidental take of smalltooth sawfish (released alive) from 2008 through 2011 as a result of the use of all gillnets in this fishery (NMFS, 2008b).

### *Marine Mammals*

Observed takes of marine mammals in the Southeast Atlantic shark gillnet fishery during 1999 – 2007 totaled 12 bottlenose dolphins and four spotted dolphins. Extrapolated observations

from 2004-2006 suggest 1.4 interactions with bottlenose dolphin and zero Atlantic spotted dolphin outside the right whale season. During the right whale season, there was one interaction with bottlenose dolphins and zero interactions with Atlantic spotted dolphins in the shark gillnet fishery from 2004 through 2006 (Garrison, 2007).

On January 22, 2006, a dead right whale was spotted offshore of Jacksonville Beach, Florida. The survey team identified the whale as a right whale calf, and photos indicated the calf as having one large wound along the midline and smaller lesions around the base of its tail. The right whale calf was located at 30°14.4' N. Lat., 81° 4.2' W. Long., which was approximately 1 nautical mile outside of the designated right whale critical habitat, but within the Southeast U.S. Restricted Area. NMFS determined that both the entanglement and death of the whale occurred within the Southeast U.S. Restricted Area, and all available evidence suggested the entanglement and injury of the whale by gillnet gear ultimately led to the death of the animal.

On February 16, 2006, NMFS published a temporary rule (71 FR 8223) to prohibit, through March 31, 2006, any vessel from fishing with any gillnet gear in the Atlantic Ocean waters between 32°00' N. Lat. (near Savannah, GA) and 27°51' N. Lat. (near Sebastian Inlet, FL) and extending from the shore eastward out to 80°00' W. long under the authority of the ALWTRP (50 CFR 229.32 (g)) and ESA. NMFS took this action based on its determination that a right whale mortality was the result of an entanglement by gillnet gear within the Southeast U.S. Restricted Area.

NMFS implemented the final rule on June 25, 2007 (72 FR 34632), that prohibits gillnet fishing, including shark gillnet fishing, from November 15 to April 15, between the NC/SC border and 29° 00' N. The action was taken to prevent the significant risk to the wellbeing of endangered right whales from entanglement in gillnet gear in the core right whale calving area during calving season. Limited exemptions to the fishing prohibitions are provided for gillnet fishing for sharks and for Spanish mackerel south of 29°00' N. lat. Shark gillnet vessels fishing between 29° 00' N and 26° 46.5' N have certain requirements as outlined 50 CFR § 229.32 from December 1 through March 31 of each year. These include vessel operators contacting the SEFSC Panama City Laboratory at least 48 hours prior to departure of a fishing trip in order to arrange for an observer.

In addition, a recent rule (October 5, 2007, 72 FR 57104) amends restriction in the Southeast U.S. Monitoring Area from December 1 through March 31. In that area no person may fish with or possess gillnet gear for sharks with webbing of 5" or greater stretched mesh unless the operator of the vessel is in compliance with the VMS requirements found in 50 CFR 635.69. The Southeast U.S. Monitoring Area is from 27°51' N. (near Sebastian Inlet, FL) south to 26°46.5' N. (near West Palm Beach, FL), extending from the shoreline or exemption line eastward to 80°00' W. In addition, NMFS may select any shark gillnet vessel regulated under the ALWTRP to carry an observer. When selected, the vessels are required to take observers on a mandatory basis in compliance with the requirements for at-sea observer coverage found in 50 CFR 229.7. Any vessel that fails to carry an observer once selected is prohibited from fishing pursuant to 50 CFR § 635. There are additional gear marking requirements that can be found at 50 CFR § 229.32.

**Table 3.8 Total Strike Gillnet Shark Catch and Bycatch by Species in order of Decreasing Abundance for all Observed Trips, 2005-2006.**  
Source: Carlson and Bethea, 2007.

Species	Total Number Caught	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Blacktip shark	9,831	89.5	0.2	10.3
Finetooth	1,687	100	0	0
Spinner Shark	1,108	100	0	0
Blacknose shark	541	100	0	0
Dusky shark	20	0	25	75
Atlantic sharpnose	7	100	0	0
Scalloped Hammerhead	7	71.4	0	28.6
Tarpon	5	0	0	100
Blackfin tuna	5	100	0	0
Manta ray	4	0	100	0
Bonnethead shark	3	100	0	0
Cobia	3	100	0	0
Cownose ray	3	0	33.3	66.7
Red drum	2	0	50	50
Bull shark	2	100	0	0
Spotted eagle ray	2	0	100	0
Nurse shark	1	100	0	0
Crevalle jack	1	100	0	0
Southern flounder	1	100	0	0
Barracudas	1	0	0	100
Remoras	1	100	0	0
Ocellated flounder	1	0	0	100
<b>Total</b>	<b>13,236</b>			

**Table 3.9 Total Shark Catch and bycatch by Species and Species Disposition in Order of Decreasing Abundance for all Observed Drift gillnet Sets 2008.**

Source: Passerotti and Carlson, 2009

Species	Total Number Caught	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Smooth dogfish	2331	79.1	20.9	0.0
Bluefish	340	74.1	11.5	14.4
Spiny dogfish	316	0.0	100.0	0.0
Spanish mackerel	268	93.3	0.0	6.7
Butterfish	59	98.3	0.0	1.7
Clearnose skate	56	0.0	100.0	0.0
Menhaden	39	0.0	7.7	92.3
King mackerel	34	97.1	0.0	2.9
Jellyfishes	34	0.0	100.0	0.0
Atlantic croaker	22	0.0	31.8	68.2
Blue crab	8	0.0	100.0	0.0
Flounders	8	0.0	100.0	0.0
Cobia	7	42.9	28.6	28.6
Atlantic sharpnose shark	7	28.6	71.4	0.0
Thresher shark	6	100.0	0.0	0.0
Stingrays	5	0.0	100.0	0.0
Remora	4	0.0	100.0	0.0
Cownose ray	3	0.0	100.0	0.0
Lookdown	3	0.0	66.7	33.3
Sand tiger shark	3	0.0	100.0	0.0
Lady fish	2	0.0	0.0	100.0
Blacktip shark	2	50.0	50.0	0.0
Sandbar shark	2	0.0	100.0	0.0
Angel shark	2	0.0	100.0	0.0
Flounders	2	100.0	0.0	0.0
Spadefish	1	0.0	100.0	0.0
Atlantic bonito	1	100.0	0.0	0.0
Red drum	1	0.0	100.0	0.0
Blacknose shark	1	0.0	0.0	100.0
Spinner shark	1	0.0	100.0	0.0
Great hammerhead shark	1	0.0	100.0	0.0
<b>Total</b>	<b>3569</b>			

**Table 3.10 Total Sink gillnet Shark Catch and Bycatch by Species in order of Decreasing Abundance for all Observed Trips, 2008.**

Source: Passerotti and Carlson, 2009.

Species	Total Number Caught	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Spanish mackerel	5875	98.3	0.0	1.7
Bluefish	1969	97.1	1.2	1.7
Blue runner	1105	99.3	0.0	0.7
Atlantic bumper	1040	86.8	6.6	6.5
Atlantic sharpnose shark	853	73.4	11.4	15.2
Spot	657	87.5	5.9	6.5
Bonnethead	609	86.4	3.9	9.7
Goosefish family	414	76.6	1.2	22.2
Yellowfin menhaden	393	60.8	5.1	34.1
Sand drum	340	0.0	25.0	75.0
Southern kingfish	281	98.2	0.0	1.8
Winter skate	238	50.0	6.3	43.7
Blacknose shark	143	98.6	1.4	0.0
Spinner shark	120	55.0	10.8	34.2
Atlantic moonfish	115	59.1	18.3	22.6
King mackerel	115	21.7	2.6	75.7
Atlantic croaker	79	78.5	2.5	19.0
Banded drum	79	16.5	13.9	69.6
Blacktip shark	73	24.7	63.0	12.3
Butterfish	57	96.5	3.5	0.0
Flounder family	49	85.7	8.2	6.1
Crevalle jack	34	100.0	0.0	0.0
Florida pompano	25	68.0	32.0	0.0
Cobia	25	28.0	32.0	40.0
Weakfish	25	84.0	0.0	16.0
Horseshoe crab	19	0.0	100.0	0.0
Atlantic cutlassfish	18	94.4	0.0	5.6
Silver perch	18	77.8	0.0	22.2
Gafftopsail catfish	17	0.0	11.8	88.2
Scalloped hammerhead shark	16	12.5	75.0	12.5
Seatrout family	15	93.3	0.0	6.7
Jellyfish family	14	0.0	0.0	100.0
Gulf kingfish	14	100.0	0.0	0.0
Gulf butterfish	12	83.3	0.0	16.7

Species	Total Number Caught	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Menhaden	10	0.0	0.0	100.0
Cownose ray	9	0.0	100.0	0.0
Sea robins	9	0.0	88.9	11.1
Herring	9	0.0	22.2	77.8
Spiny dogfish	9	0.0	22.2	77.8
Pomfrets	7	0.0	0.0	100.0
Atlantic thread herring	6	16.7	33.3	50.0
Spadefish	6	0.0	16.7	83.3
Unknown teleost-eaten/damaged	6	0.0	0.0	100.0
Lookdown	5	0.0	0.0	100.0
Ladyfish	5	80.0	20.0	0.0
Remoras	6	0.0	100.0	0.0
Finetooth shark	4	25.0	75.0	0.0
Rays	3	0.0	100.0	0.0
Little tunny	3	100.0	0.0	0.0
Dusky shark	3	0.0	0.0	100.0
Houndfish	2	100.0	0.0	0.0
Inshore lizardfish	2	0.0	0.0	100.0
Swimming crabs	2	0.0	50.0	50.0
Devil ray	2	0.0	50.0	50.0
Spotted eagle ray	2	0.0	100.0	0.0
Smooth dogfish	2	0.0	100.0	0.0
Sand tiger shark	2	0.0	100.0	0.0
Atlantic guitarfish	1	0.0	100.0	0.0
Southern flounder	1	100.0	0.0	0.0
Pigfish	1	100.0	0.0	0.0
Bullnose ray	1	0.0	100.0	0.0
Manta ray	1	0.0	100.0	0.0
Silver seatrout	1	0.0	0.0	100.0
Barred grunt	1	0.0	100.0	0.0
Unicorn filefish	1	100.0	0.0	0.0

**Table 3.11 Total number of Observed Sea Turtle Interactions by Year from 2000-2008 in the Shark Gillnet Fishery.**

Source: Directed Shark Gillnet Observer Program. Letters in parentheses indicate whether the sea turtle was released alive (A), dead (D), or unknown (U).

Year	Leatherback Sea Turtle	Loggerhead Sea Turtle	Total
2000		1 (U)	1
2001		1 (U)	1
2002		1 (U)	1
2003			0
2004			0
2005	1(A)	5 (4A, 1D)	6
2006		3 (2A, 1D)	3
2007		4 (3A, 1U)	4
2008			0
<b>Total</b>	1	15	16

**Table 3.12 Observed Interactions of Sea Turtles in the PLL Fishery and Directed Shark BLL and Gillnet Fishery by Year and Gear Type (LGH = Loggerhead, LTRB = Leatherback).**

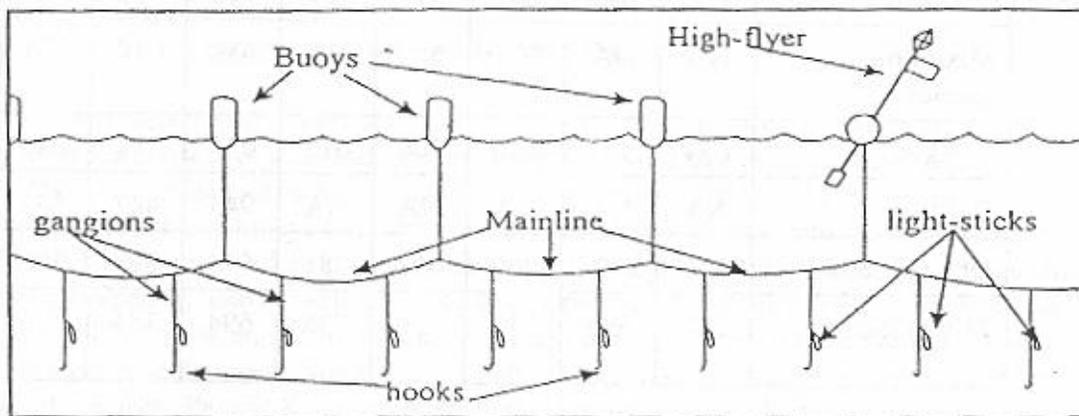
Source: Directed Shark Gillnet Observer Program, BLL Observer Program, PLL Observer Program.

		2004			2005			2006			2007			2008		
		LGH	LTRB	Other	LGH	LTRB	Other	LGH	LTRB	Other	LGH	LTRB	Other	LGH	LTRB	Other
Gillnet	Drift Gillnet	0	0	0	4	1	0	0	0	0	1	0	0	0	0	0
	Strikenet	0	0	0	1	0	0	3	0	0	0	0	0	0	0	0
	Sink Gillnet	0	0	0	1	0	0	0	0	0	3	0	0	0	0	0
Pelagic Longline		733	1,362	0	282	368	0	558	415	11	542	500	1	Data not available		
Bottom Longline		5	0	0	4	2	0	12	0	0	5	0	0	1	0	0
Total		2,100			662			999			1,052					

### 3.4.3 Pelagic Longline Fishery

#### 3.4.3.1 Domestic History and Current Management

The U.S. PLL fishery for Atlantic HMS primarily targets swordfish, yellowfin tuna, and bigeye tuna in various areas and seasons. Secondary target species include dolphin fish, albacore tuna, and to a lesser degree sharks. Although this gear can be modified (*e.g.*, depth of set, hook type, *etc.*) to target swordfish, tunas, or sharks, it is generally a multi-species fishery. These vessel operators are opportunistic, switching gear style and making subtle changes to target the best available economic opportunity of each individual trip. PLL gear sometimes attracts and hooks non-target finfish with little or no commercial value as well as species that cannot be retained by commercial fishermen due to regulations, such as billfish. Pelagic longlines may also interact with protected species, such as marine mammals, sea turtles, and seabirds. Thus, this gear has been classified as a Category I fishery with respect to MMPA. Any species (or undersized catch of permitted species) that cannot be landed due to fishery regulations is required to be released, whether dead or alive.



**Figure 3.4** Typical U.S. PLL Gear.  
Source: Arocha, 1996

PLL gear is composed of several parts (see Figure 3.4<sup>1</sup>) (NMFS, 1999). The primary fishing line, or mainline of the longline system, can vary from five to 40 miles in length, with approximately 20 to 30 hooks per mile. The depth of the mainline is determined by ocean currents and the length of the floatline, which connects the mainline to several buoys, and periodic markers which can have radar reflectors or radio beacons attached. Each individual hook is connected by a leader, or gangion, to the mainline. Lightsticks, which contain chemicals that emit a glowing light, are often used, particularly when targeting swordfish. When attached to the hook and suspended at a certain depth, lightsticks attract baitfish, which may, in turn, attract pelagic predators (NMFS, 1999).

When targeting swordfish, PLL gear is generally deployed at sunset and hauled at sunrise to take advantage of swordfish nocturnal near-surface feeding habits (NMFS, 1999). In general,

<sup>1</sup> As of April 1, 2001, (66 FR 17370) a vessel is considered to have pelagic longline gear on board when a power-operated longline hauler, a mainline, floats capable of supporting the mainline, and leaders (gangions) with hooks are on board.

longlines targeting tunas are set in the morning, deeper in the water column, and hauled in the evening. Except for vessels of the distant water fleet, which undertake extended trips, fishing vessels preferentially target swordfish during periods when the moon is full to take advantage of increased densities of pelagic species near the surface. The number of hooks per set varies with line configuration and target species (Table 3.13) (NMFS, 1999). The PLL gear components may also be deployed as a trolling gear to target surface feeding tunas. Under this configuration, the mainline and gangions are elevated and actively trolled so that the baits fish on or above the water’s surface. This style of fishing is often referred to as “green-stick fishing,” and reports indicate that it can be extremely efficient compared to conventional fishing techniques. For more information on green-stick fishing gear and the configurations allowed under current regulations, please refer to section 4.8 of the 2008 SAFE Report for Atlantic HMS.

**Table 3.13 Average Number of Hooks per PLL Set, 1999-2008.**

Source: PLL logbook data.

Target Species	2000	2001	2002	2003	2004	2005	2006	2007	2008
Swordfish	550	625	695	711	701	747	742	672	708
Bigeye tuna	454	671	755	967	400	634	754	773	751
Yellowfin tuna	772	731	715	720	696	691	704	672	678
Mix of tuna species	638	719	767	765	779	692	676	640	747
Shark	621	571	640	696	717	542	509	494	377
Dolphin	943	447	542	692	1,033	734	988	789	989
Other species	504	318	300	865	270	889	236	NA	NA
Mix of species	694	754	756	747	777	786	777	757	749

### *Regional U.S. Pelagic Longline Fisheries Description*

The U.S. PLL fishery sector has historically been comprised of five relatively distinct segments with different fishing practices and strategies, including the Gulf of Mexico yellowfin tuna fishery, the South Atlantic-Florida east coast to Cape Hatteras swordfish fishery, the Mid-Atlantic and New England swordfish and bigeye tuna fishery, the U.S. distant water swordfish fishery, and the Caribbean Islands tuna and swordfish fishery. Each vessel type has different range capabilities due to fuel capacity, hold capacity, size, and construction. In addition to geographical area, these segments have historically differed by percentage of various target and non-target species, gear characteristics, and deployment techniques. Some vessels fish in more than one fishery segment during the course of the year (NMFS, 1999). Due to the various changes in the fishery, *i.e.*, regulations, operating costs, market conditions, availability, etc., the fishing practices and strategies of these different segments may change over time.

### *Management of the U.S. Pelagic Longline Fishery*

The U.S. Atlantic PLL fishery is restricted by a swordfish quota, divided between the North and South Atlantic (separated at 5°N. Lat.). Other regulations include minimum sizes for swordfish, yellowfin, bigeye, and bluefin tuna; bluefin tuna target catch requirements; shark

quotas; protected species incidental take limits; reporting requirements (including logbooks); gear and bait requirements; limited access vessel permits, and mandatory workshop requirements. Current billfish regulations prohibit the retention of billfish by commercial vessels, or the sale of billfish from the Atlantic Ocean. As a result, all billfish hooked on PLL gear must be discarded, and are considered bycatch. PLL is a heavily managed gear type and, as such, is strictly monitored. Because it is difficult for PLL fishermen to avoid undersized or prohibited fish in some areas, NMFS has closed areas in the Gulf of Mexico and along the east coast. The intent of these closures is to decrease bycatch in the PLL fishery by closing those areas with the highest rates of bycatch. There are also time/area closures for PLL fishermen designed to reduce the incidental catch of bluefin tuna and sea turtles. In order to enforce time/area closures and to monitor the fishery, NMFS requires all PLL vessels to report positions on an approved VMS.

In addition to the regulations mentioned above, vessels with PLL gear onboard, at all times, in all areas open to PLL fishing, excluding the NED, must possess onboard and/or use only 16/0 or larger non-offset circle hooks and/or 18/0 or larger circle hooks with an offset not to exceed ten degrees. Only whole finfish and squid baits may be possessed and/or utilized with allowable hooks. All PLL vessels must possess and use sea turtle handling and release gear in compliance with NMFS careful release protocols. Additionally, all PLL vessel owners and operators must be certified in the use of the protected species handling and release gear. Certification must be renewed every three years and can be obtained by attending a workshop. Approximately 18 - 24 workshops are conducted annually, and they are held in areas with significant numbers of PLL permit holders.

In 2009, to protect pilot whales and Risso's dolphins, the PLTRP (74 FR 23349, May 19, 2009) included a requirement that PLL vessel operators fishing in the Cape Hatteras Special Research Area must contact NOAA Fisheries at least 48 hours prior to a trip, and carry observers if requested. The PLTRP also established a 20 nm upper limit on mainline length for all PLL sets in the mid-Atlantic Bight (MAB), and required that an informational placard be displayed in the wheelhouse and on the working deck of all active PLL vessels in the Atlantic fishery.

### Permits

The 1999 FMP established six different limited access permit types: (1) directed swordfish, (2) incidental swordfish, (3) swordfish handgear, (4) directed shark, (5) incidental shark, and (6) tuna longline. To reduce bycatch in the PLL fishery, these permits were designed so that the swordfish directed and incidental permits are valid only if the permit holder also holds both a tuna longline and a shark permit. Similarly, the tuna longline permit is valid only if the permit holder also holds both a swordfish (directed or incidental, not handgear) and a shark permit. This allows limited retention of species that might otherwise have been discarded.

As of October 2009, approximately 259 tuna longline limited access permits had been issued. In addition, approximately 187 directed swordfish limited access permits, 72 incidental swordfish limited access permits, 223 directed shark limited access permits, and 285 incidental shark limited access permits had been issued (see Chapter 8 for more information on permits). Vessels with limited access swordfish and shark permits do not necessarily use PLL gear, but these are the only permits that allow for the use of PLL gear in HMS fisheries.

## Monitoring and Reporting

PLL fishermen and the dealers who purchase HMS from them are subject to reporting requirements. NMFS has extended dealer reporting requirements to all swordfish importers as well as dealers who buy domestic swordfish from the Atlantic. These data are used to evaluate the impacts of harvesting on the stock and the impacts of regulations on affected entities.

Commercial HMS fisheries are monitored through a combination of vessel logbooks, dealer reports, port sampling, cooperative agreements with states, and scientific observer coverage. Logbooks contain information on fishing vessel activity, including dates of trips, number of sets, area fished, number of fish, and other marine species caught, released, and retained. In some cases, social and economic data such as volume and cost of fishing inputs are also required.

### Pelagic Longline Observer Program

During 2007, NMFS observers recorded 944 PLL sets for an overall fishery coverage of 10.8 percent. (Fairfield and Garrison, 2008). Table 3.14 details the amount of observer coverage in past years for this fleet. Generally, due to logistical problems, it has not always been possible to place observers on all selected trips. NMFS is working towards improving compliance with observer requirements and facilitating communication between vessel operators and observer program coordinators. In addition, fishermen are reminded of the safety requirements for the placement of observers specified at 50 CFR 600.746, and the need to have all safety equipment on board required by the U.S. Coast Guard.

In the PLTRP (74 FR 23349, May 19, 2009), it was recommended that NMFS increase observer coverage to 12 to 15 percent throughout all Atlantic pelagic longline fisheries that interact with pilot whales and Risso’s dolphins to ensure representative sampling of fishing effort. If resources are not available to provide such observer coverage for all fisheries, regions, and seasons, the PLTRT recommended NMFS allocate observer coverage to fisheries, regions, and seasons with the highest observed or reported bycatch rates of pilot whales. The PLTRT recommended that additional coverage be achieved either by increasing the number of NMFS observers who have been specially trained to collect additional information supporting marine mammal research, or by designating and training special “marine mammal observers” to supplement traditional observer coverage.

**Table 3.14 Observer Coverage of the PLL Fishery.**  
 Source: Yeung, 2001; Garrison, 2003b; Garrison and Richards, 2004; Garrison, 2005; Fairfield-Walsh and Garrison, 2006; Fairfield-Walsh & Garrison, 2007; Fairfield & Garrison, 2008; Garrison, Stokes & Fairfield, 2009.

Year	Number of Sets Observed			Percentage of Total Number of Sets		
1999	420			3.8		
2000	464			4.2		
2001*	Total	Non-NED	NED	Total	Non-NED	NED
	584	398	186	5.4	3.7	100.0

Year	Number of Sets Observed			Percentage of Total Number of Sets		
	Total	Non-EXP	EXP	Total	Non-EXP	EXP
2002*	856	353	503	8.9	3.9	100.0
2003*	1,088	552	536	11.5	6.2	100.0
	Total	Non-EXP	EXP	Total	Non-EXP	EXP
2004**	702	642	60	7.3 %	6.7 %	100.0 %
2005**	796	549	247	10.1 %	7.2 %	100.0 %
2006	568	-	-	7.5 %	-	-
2007	944	-	-	10.8 %	-	-
2008	1,190	-	101***	13.6 %	-	100.0***

\*In 2001, 2002, and 2003, 100 percent observer coverage was required in the NED research experiment.

\*\* In 2004 and 2005 there was 100 percent observer coverage in experimental fishing (EXP).

\*\*\* In 2008, 100 percent observer coverage was required in experimental fishing in the FEC, Charleston Bump, and GOM, but these sets are not included in extrapolated bycatch estimates because they are not representative of normal fishing.

### 3.4.3.2 Recent Catch and Landings

U.S. PLL catch (including bycatch, incidental catch, and target catch) is largely related to vessel and gear characteristics, but is summarized for the whole fishery in Table 3.15.

From 1992 through 2004, the Pelagic Observer Program (POP) recorded a total of 86,485 elasmobranchs (29 percent of the total catch) caught by U.S. PLL vessels targeting tunas and swordfish (Keene, *et al.*, 2007). Of the 42 elasmobranch species observed, blue sharks were numerically dominant (67.3 percent of the total elasmobranch catch), with blue, silky, dusky, shortfin mako, porbeagle, unidentified sharks, and skates/rays making up the majority (90.5 percent).

**Table 3.15 Reported Catch of Species Caught by U.S. Atlantic PLLs, in Number of Fish, for 2001-2008**  
Source: PLL Logbook Data.

Species	2001	2002	2003	2004	2005	2006	2007	2008
Swordfish Kept	47,560	49,320	51,835	46,440	41,139	38,241	45,933	42,800
Swordfish Discarded	13,993	13,035	11,829	10,675	11,134	8,900	11,823	11,194
Blue Marlin Discarded	635	1,175	595	712	567	439	611	687
White Marlin Discarded	848	1,438	809	1,053	989	557	744	670
Sailfish Discarded	356	379	277	424	367	277	321	506
Spearfish Discarded	137	148	108	172	150	142	147	197
Bluefin Tuna Kept	177	178	273	475	375	261	337	343
Bluefin Tuna Discarded	348	585	881	1,031	765	833	1,345	1,417

Species	2001	2002	2003	2004	2005	2006	2007	2008
Bigeye, Albacore, Yellowfin, Skipjack Tunas Kept	80,466	79,917	63,321	76,962	57,132	73,058	70,390	50,108
Pelagic Sharks Kept	3,460	2,987	3,037	3,440	3,149	2,098	3,504	3,500
Pelagic Sharks Discarded	23,813	22,828	21,705	25,355	21,550	24,113	27,478	28,786
Large Coastal Sharks Kept	6,478	4,077	5,326	2,292	3,362	1,768	546	115
Large Coastal Sharks Discarded	4,836	3,815	4,813	5,230	5,877	5,326	7,133	6,732
Dolphin Kept	27,586	30,384	29,372	38,769	25,707	25,658	68,124	43,511
Wahoo Kept	3,068	4,188	3,919	4,633	3,348	3,608	3,073	2,571
Turtle Interactions	424	465	399	369	152	128	300	476
<i>Number of Hooks (x 1,000)</i>	<i>7,564</i>	<i>7,150</i>	<i>7,008</i>	<i>7,276</i>	<i>5,911</i>	<i>5,662</i>	<i>6,291</i>	<i>6,498</i>

### *Incidental bycatch*

Other species including marine mammals, turtles, seabirds, and finfish are occasionally hooked by PLL vessels. For detailed descriptions of interactions with these species, please refer to section 3.4.1.2 of the 2006 Consolidated HMS FMP.

### **3.4.3.3 Safety Issues**

Like all offshore fisheries, pelagic longlining can be dangerous. Trips are often long, the work is arduous, and the nature of setting and hauling longline gear may result in injury or death. Like all other HMS fisheries, longline fishermen are exposed to unpredictable weather. NMFS does not wish to exacerbate unsafe conditions through the implementation of regulations. Therefore, NMFS considers safety factors when implementing management measures in the PLL fishery. For example, all time/area closures are expected to be closed to fishing, not transiting, in order to allow fishermen to make a direct route to and from fishing grounds. NMFS seeks comments from fishermen on any safety concerns they may have. Fishermen have pointed out that, due to decreasing profit margins, they may fish with less crew or less experienced crew or may not have the time or money to complete necessary maintenance tasks. NMFS encourages fishermen to be responsible in fishing and maintenance activities.

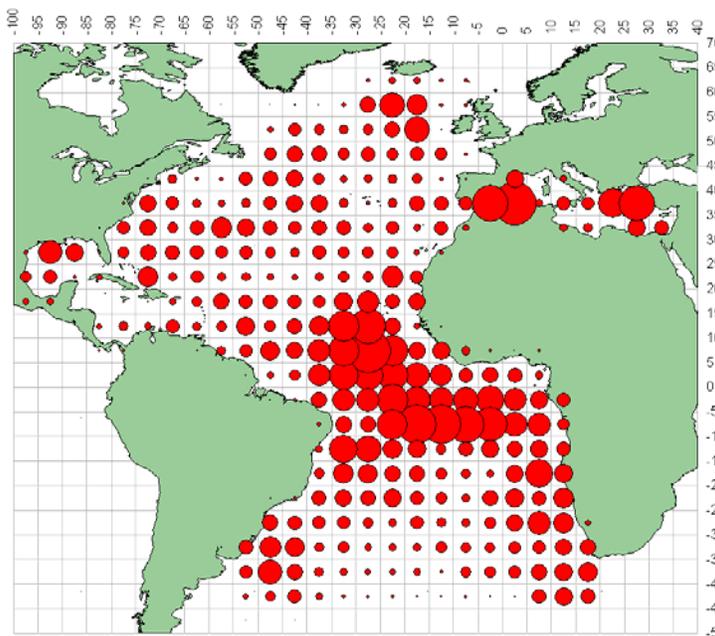
### **3.4.3.4 International Issues and Catch**

PLL fisheries for Atlantic HMS primarily target swordfish and tunas. Directed PLL fisheries in the Atlantic have been operated by Spain, the United States, and Canada since the late 1950s or early 1960s. The Japanese PLL tuna fishery started in 1956 and has operated throughout the Atlantic since then (NMFS, 1999). Most of the 46 other ICCAT nations now also operate PLL vessels.

ICCAT generally establishes management recommendations on a species (*e.g.*, swordfish) or issue basis (*e.g.*, data collection) rather than by gear type. For example, ICCAT typically establishes quotas or landing limits by species, not gear type. In terms of data collection, ICCAT may require use of specific collection protocols or specific observer coverage levels in certain fisheries or on vessels of a certain size, but these are usually applicable to all gears, and not specific to any one gear type. However, there are a handful of management recommendations that are specifically applicable to the international PLL fishery. These include, a prohibition on longlining in the Mediterranean Sea in June and July by vessels over 24 meters in length, a prohibition on PLL fishing for bluefin tuna in the Gulf of Mexico, and mandated reductions in Atlantic white and blue marlin landings for PLL and purse seine vessels from specified levels, among others.

Because most ICCAT management recommendations pertain to individual species or issues, as discussed above, it is often difficult to obtain information specific to the international PLL fishery. For example, a discussion of the authorized TAC for specific species in this section of the document would be of limited utility because it is not possible to identify what percentage of quotas are allocated to PLL. Division of quota, by gear type, is typically done by individual countries.

Nevertheless, ICCAT does report landings by gear type. Available data indicate that longline effort produces the second highest volume of catch and effort, and is the most broadly distributed (longitudinally and latitudinally) of the gears used to target ICCAT managed species (SCRS, 2004). Purse seines produce the highest volume of catch of ICCAT managed species from the Atlantic (SCRS, 2004). Figure 3.5 shows the aggregate distribution of hooks from all fishing fleets from 2000-2006. In 2007, international longline landings of HMS in fisheries in which the United States participated totaled 102,876 mt, which represented a continuation of the generally decreasing trend since 1999.



**Figure 3.5** Aggregate Distribution of Hooks Deployed by All ICCAT Parties 2000-2006.  
Source: SCRS 2008b.

Scientific observer data are being collected on a range of PLL fleets in the Atlantic and will be increasingly useful in better quantifying total catch, catch composition, and disposition of catch as these observer programs mature. Previous ICCAT observer coverage requirements of five percent for non-purse seine vessels that participated in the bigeye and yellowfin tuna fishery, including PLL (per ICCAT Recommendation 96-01), are no longer in force. There is currently no ICCAT required minimum level of observer coverage specific to PLL fishing. Nevertheless, the United States has implemented a mandatory observer program in the U.S. PLL fishery. Japan is required to have eight percent observer coverage of its vessels fishing for swordfish in the North Atlantic, which are primarily PLL vessels, however, the recommendation is not specific to vessel or gear type. ICCAT recommendation 04-01, a conservation and management recommendation for the bigeye tuna fishery, requires at least five percent observer coverage of PLL vessels over 24 meters participating in that particular fishery.

ICCAT has also developed a running tabulation of the diversity of species caught by the various gears used to target tunas and tuna-like species in the Atlantic and Mediterranean (Table 3.16). For all fish species, longline gear shows the highest documented diversity of catch, followed by gillnets and purse seine. For seabirds, longline gear again shows the highest diversity of catch, while for sea turtles and marine mammals, purse seine and gillnet have a higher documented diversity of species for Atlantic tuna fleets (SCRS, 2004).

**Table 3.16 ICCAT Bycatch Table (LL, longline; GILL, gillnets; PS, purse-seine; BB, baitboat; HARP, harpoon; TRAP, traps).**  
Source: SCRS, 2004.

**ICCAT Bycatch Table (www.iccat.es)**

Count	Group	LL	GILL	PS	BB	HARP	TRAP	OTHER
214	<i>All Groups</i>	149 69.6%	110 51.4%	78 36.4%	12 5.6%	33 15.4%	20 9.3%	43 20.1%
12	<i>Skates and Rays</i>	10 83.3%	6 50.0%	6 50.0%	0 0.0%	2 16.7%	0 0.0%	1 8.3%
46	<i>Coastal Sharks</i>	45 97.8%	19 41.3%	6 13.0%	1 2.2%	7 15.2%	2 4.3%	9 19.6%
11	<i>Pelagic Sharks</i>	10 90.9%	7 63.6%	5 45.5%	0 0.0%	5 45.5%	2 18.2%	4 36.4%
23	<i>Teleosts (ICCAT Species)</i>	23 100.0%	18 78.3%	16 69.6%	9 39.1%	6 26.1%	7 30.4%	11 47.8%
82	<i>Teleosts (excluding Scombridae and billfishes)</i>	44 53.7%	37 45.1%	25 30.5%	2 2.4%	5 6.1%	4 4.9%	17 20.7%
5	<i>Sea Turtles</i>	3 60.0%	4 80.0%	5 100.0%	0 0.0%	2 40.0%	1 20.0%	1 20.0%
9	<i>Sea Birds</i>	8 88.9%	2 22.2%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
26	<i>Marine Mammals</i>	6 23.1%	17 65.4%	15 57.7%	0 0.0%	6 23.1%	4 15.4%	0 0.0%

### *U.S. Pelagic Longline Catch in Relation to International Catch*

#### Highly Migratory Species

The U.S. PLL fleet represents a small fraction of the international PLL fleet that competes on the high seas for catches of tunas and swordfish. In recent years, the proportion of U.S. PLL landings of HMS, for the fisheries in which the United States participates, has remained relatively stable in proportion to international landings. Historically, the U.S. fleet has accounted for less than 0.5 percent of the landings of swordfish and tuna from the Atlantic Ocean south of 5° N. Lat. and does not operate at all in the Mediterranean Sea. Tuna and swordfish landings by foreign fleets operating in the tropical Atlantic and Mediterranean are greater than the catches from the north Atlantic area where the U.S. fleet operates. Within the area where the U.S. longline fleet operates, U.S. longline landings still represent a limited fraction of total landings. In recent years (2000-2008), U.S. longline landings have averaged 4.8 percent of total Atlantic longline landings, ranging from a high of 5.5 percent in 2002 to a low of 4.3 percent in 2001

#### *Atlantic Sharks*

Stock assessments and data collection for international shark fisheries have improved in recent years due to increased reporting requirements adopted by ICCAT. Specifically, in 2004, ICCAT adopted Recommendation 04-10, which required ICCAT Contracting Parties (CPCs) to report Task I and Task II data for catches of sharks in accordance with ICCAT data reporting procedures to improve stock assessments. Recommendation 04-10 also banned shark finning, required vessels to fully utilize their entire catches of sharks, and encouraged the release of live sharks caught incidentally and not used for food. Recommendation 06-10 called for ICCAT's

Standing Committee for research and Statistics (SCRS) to conduct stock assessments and recommend management alternatives for Atlantic blue sharks and shortfin mako sharks in time for consideration at the 2008 annual ICCAT meeting. Recommendation 07-06 called for the SCRS to conduct stock assessments and recommend management alternatives for porbeagle sharks, for Contracting Parties to take appropriate measures to reduce fishing mortality on porbeagles and North Atlantic shortfin mako sharks, and to implement research on pelagic shark species to identify nursery areas. It also required that Contracting Parties, Cooperating non-Contracting Parties, Entities, and Fishing Entities submit Task I and II data for sharks in advance of the next SCRS assessment.

In 2008, the SCRS assessed blue sharks and shortfin mako sharks. The SCRS concluded that blue sharks were not overfished or experiencing overfishing, and that shortfin mako sharks were at or slightly below levels that could support MSY with widely varying estimates of fishing mortality (0.48 to 3.77). At the 2008 meeting, ICCAT adopted Recommendation 08-07, which required the live release of bigeye thresher sharks that are brought to the boat alive, and required reporting bycatch and live releases of bigeye thresher sharks. Additionally, in 2008, ICCAT adopted Resolution 08-08 concerning porbeagle shark.

In response to Resolution 08-08, an assessment of porbeagle sharks was conducted jointly with the International Council for the Exploration of the Seas (ICES) in 2009. The SCRS attempted to assess the four porbeagle stocks in the Atlantic Ocean: Northwest, Northeast (including the Mediterranean), Southwest and Southeast. In general, data for southern hemisphere porbeagle were too limited to provide a robust indication on the status of the stocks. For the Southwest, the assessment models suggested a potential decline in porbeagle abundance to levels below MSY and fishing mortality rates above those producing MSY, but the data were generally too limited to allow definition of sustainable harvest levels. For the Southeast, the data were too limited to assess their status. Available catch rate patterns suggest stability in the porbeagle stock since the early 1990s in the Southeast, but this trend cannot be viewed in a longer term context and thus are not informative on current levels relative to  $B_{MSY}$ .

The Northeast Atlantic porbeagle stock has the longest history of commercial exploitation, but there is considerable uncertainty in identifying the current status relative to virgin biomass. Exploratory assessments indicate that current biomass is below  $B_{MSY}$  and that recent fishing mortality is near or above  $F_{MSY}$ . Recovery of this stock to  $B_{MSY}$  under no fishing mortality is estimated to take 15-34 years. The current European Community (EC) total allowable catch (TAC) of 436 mt in effect for the Northeast Atlantic may allow the stock to remain stable, at its current depleted biomass level, under most credible model scenarios. Catches close to the current TAC (e.g. 400 mt) could allow rebuilding to  $B_{MSY}$  under some model scenarios, but with a high degree of uncertainty and on a time scale of approximately 60 years.

An update of the Canadian assessment of the Northwest Atlantic porbeagle stock indicated that biomass is depleted to well below  $B_{MSY}$ , but recent fishing mortality is below  $F_{MSY}$  and recent biomass appears to be increasing. The Canadian assessment projected that with no fishing mortality, the stock could rebuild to  $B_{MSY}$  level in approximately 20-60 years, whereas surplus-production based projections indicated 20 years would suffice. Under the Canadian strategy of a

four percent exploitation rate, the stock is expected to recover in 30 to 100+ years according to the Canadian projections.

The most recent catch totals for blue, shortfin mako, and porbeagle sharks are presented in Table 3.17.

**Table 3.17 Estimated International Landings of Pelagic Sharks for All Countries in the Atlantic: 2000-2008 (mt ww)<sup>1</sup>.**

Source: SCRS, 2009

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Blue Shark (N. Atl + S. Atl + MED)	37,608	33,436	31,121	34,591	34,687	41,743	39,071	46,014	53,234
Shortfin Mako (N. Atl + S. Atl + MED)	4,671	4,410	5,080	7,189	7,104	6,305	6,022	6,591	5,028
Porbeagle (N. Atl + S. Atl + MED)	1,469	1,000	849	647	745	572	508	515	606
<b>Total International Catches</b>	<b>43,748</b>	<b>38,846</b>	<b>37,050</b>	<b>42,427</b>	<b>42,536</b>	<b>48,620</b>	<b>45,601</b>	<b>53,120</b>	<b>58,868</b>
U.S. Blue Shark Catches <sup>1</sup>	428	148	68	1	72	68	47	55	137
U.S. Shortfin Mako Catches <sup>1</sup>	454	397	415	142	411	187	130	223	193
U.S. Porbeagle Catches <sup>1</sup>	1	1	1	0	1	0	0	0	1
<b>Total U.S. Catches<sup>1</sup></b>	<b>883</b>	<b>546</b>	<b>484</b>	<b>143</b>	<b>484</b>	<b>255</b>	<b>177</b>	<b>278</b>	<b>331</b>
<b>U.S. Catches<sup>1</sup> as a Percent of Total International Catches</b>	<b>2.0 %</b>	<b>1.4 %</b>	<b>1.3 %</b>	<b>0.3 %</b>	<b>1.1 %</b>	<b>0.5 %</b>	<b>0.4 %</b>	<b>0.5 %</b>	<b>0.6 %</b>

<sup>1</sup> Includes catches and discards

### **3.4.4 Recreational Handgear**

The following section describes the recreational portion of the handgear fishery, and is primarily focused upon rod and reel fishing. The HMS Handgear (rod and reel, handline, buoy gear, and harpoon) fishery includes both commercial and recreational fisheries and is described fully in Section 2.5.8 of the 1999 FMP and 2006 Consolidated HMS FMP. Handgear components may also be deployed as a specialized trolling gear to target surface-feeding tunas. Under this configuration, the line and leaders are elevated and actively trolled so that the baits fish on or above the water's surface. This style of fishing is often referred to as "green-stick fishing," and reports indicate that it can be extremely efficient compared to conventional fishing techniques. For more information on green-stick fishing gear and the configurations allowed under current regulations, please refer the 2008 SAFE Report.

#### ***3.4.4.1 Overview of History and Current Management***

Atlantic HMS are all targeted by domestic recreational fishermen using rod and reel gear. Since March 1, 2003, an HMS Angling category permit has been required to fish recreationally for any HMS-managed species (67 FR 77434, December 18, 2002). Prior to March 1, 2003, the regulations only required vessels fishing recreationally for Atlantic tunas to possess an Atlantic Tunas Angling category permit. On January 7, 2003, a final rule establishing a mandatory reporting system for all non-tournament recreational landings of Atlantic marlins, sailfish, and swordfish was published in the Federal Register (68 FR 711). The reporting requirement became effective in March 2003. All HMS fishing tournaments are required to register with NMFS at least four weeks prior to the commencement of tournament fishing activities. If selected, tournament operators are required to report the results of their tournament to the NMFS Southeast Fisheries Science Center.

The recreational shark fishery is managed using bag limits, minimum size requirements, and landing requirements (sharks must be landed with head and fins naturally attached). Additionally, the possession of 21 species of sharks is prohibited. Recreational fishermen are allowed to keep non-ridgeback large coastal sharks, tiger sharks, pelagic sharks, and small coastal sharks. As of July 24, 2008, recreational fishermen have been prohibited from keeping sandbar or silky sharks.

#### ***3.4.4.2 Most Recent Catch and Landings Data***

The recreational landings database for Atlantic HMS consists of information obtained through surveys including the Marine Recreational Fishery Statistics Survey (MRFSS), Large Pelagic Survey (LPS), Southeast Headboat Survey (HBS), Texas Headboat Survey, Recreational Billfish Survey (RBS) tournament data, and the Recreational non-tournament swordfish and billfish landings database. Descriptions of these surveys, the geographic areas they include, and their limitations, were discussed in Section 2.6.2 of the 1999 FMP and Section 2.3.2 of the 1999 Billfish Amendment.

Historically, fishery survey strategies (including the MRFSS, LPS, and RBS) have not captured all landings of recreationally-caught swordfish. Although some swordfish handgear

fishermen have commercial permits, many others land swordfish strictly for personal consumption. Therefore, NMFS has implemented regulations to improve recreational swordfish and billfish monitoring and conservation. These regulations stipulate that all non-tournament recreational landings of swordfish and billfish must be reported by phone at (800) 894-5528 or web portal at <http://www.hmspermits.gov>. All reported recreational swordfish landings are counted against the incidental swordfish quota.

Reported domestic landings of Atlantic bluefin tuna (1983 through 1998) and BAYS tuna (1995 through 1997) were presented in Section 2.2.3 of the 1999 FMP. Updated landings for all recreational rod and reel fisheries are presented below in Table 3.20 from 2001 through 2008. Recreational landings of swordfish are monitored by the LPS, MRFSS, RBS, and mandatory recreational reporting requirements via <http://www.hmspermits.gov>.

An ad hoc committee of NMFS scientists reviewed the methodology and data used to estimate recreational landings of Atlantic HMS during 2004. The committee was charged with reviewing the 2002 estimates of U.S. recreational landings of bluefin tuna, white marlin and blue marlin reported by NMFS to ICCAT. The committee was also charged with recommending methods to be used for the estimation of 2003 recreational fishery landings of bluefin tuna and marlin. Although the committee discovered and corrected a few problems with the raw data from the LPS and the estimation program used to produce the estimates, the committee concluded that the estimation methods for producing the 2002 estimates were consistent with methods used in previous years. The Committee's report is available at: [http://www.nmfs.noaa.gov/sfa/hms/Tuna/2002-2003\\_Bluefin-Marlin\\_Report-120304.pdf](http://www.nmfs.noaa.gov/sfa/hms/Tuna/2002-2003_Bluefin-Marlin_Report-120304.pdf).

The Marine Recreational Information Program, or MRIP, is a new data collection and analysis initiative being implemented by NMFS to help ensure the long-term sustainability of America's fisheries and the health of our oceans. MRIP represents a management approach based on evaluating entire ecosystems, as opposed to single species of fish, and is evolving hand-in-hand with the latest marine science.

Currently being phased in across the nation, MRIP provides a more comprehensive and detailed picture of the number of trips being taken by recreational anglers, the amount and species of fish they are catching, where and when those fish are being caught, and the economic impact of recreational fishing on local, regional and national economies.

Through more timely and accurate fishing data, MRIP provides policy makers the information they need to make sound decisions based on the best science. As a program built on broad and continuing stakeholder input, MRIP also empowers anglers and other ocean enthusiasts to become a part of the resource management, conservation, and economic decision-making processes that impact their lives.

MRIP is a system of coordinated data collection programs designed to address specific regional needs for recreational fishing information. This regional approach based on a nationally consistent standard will ensure that the appropriate, targeted, place-based information is being collected to best meet the needs of managers and stakeholders, and that it is being done in a scientifically rigorous way.

## Shark Recreational Fishery

Recreational landings of sharks are an important component of HMS fisheries. Recreational shark fishing with rod and reel is a popular sport at all social and economic levels. Depending upon the species, sharks can be caught virtually anywhere in salt water. Recreational shark fisheries often occur in nearshore waters accessible to private vessels and charter/headboats; however, shore-based and offshore fishing also occur. The following tables provide a summary of landings for each of the three species groups. Since 2003, the recreational fishery has been limited to rod and reel and handline gear only. Similar state regulations along the Atlantic seaboard will be implemented through an Atlantic States Marine Fisheries Commission (ASMFC) interstate fishery management plan in 2010.

**Table 3.18** Estimates of Total Recreational Harvest of Atlantic Sharks: 1999-2008 (numbers of fish in thousands).

Source: Cortés and Neer 2005, Cortés, pers. comm. Estimates include prohibited species.

Species Group	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
LCS	82.5	138.2	137.4	80.6	89.0	67.4	85.0	59.1	68.8	45.0
Pelagic	11.1	13.3	3.8	4.7	4.3	5.0	5.4	16.5	9.0	2.8
SCS	114.4	198.4	210.8	152.5	134.3	127.0	118.8	117.2	167.6	107.9
Unclassified	7.3	11.2	24.7	5.4	18.4	28.5	47.6	7.5	23.9	6.1

**Table 3.19** Recreational Harvest of Selected Atlantic Sharks by Species, in number of fish: 1999-2008.

Sources: Cortés and Neer 2005, Cortés, pers. comm.

Shark Species	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Shortfin mako	1,383	5,813	2,827	3,206	3,906	5,052	3,857	3,352	2,556	1,904
Blacknose	6,049	10,340	14,885	11,390	6,615	15,101	7,101	9,914	9,177	3,718
Bonnethead	38,982	57,708	60,094	51,667	41,314	42,429	32,227	24,885	42,444	22,973
Finetooth	78	1,562	6,628	3,159	1,788	366	3,129	572	4,048	2,308
Atlantic sharpnose	6,049	10,340	14,885	11,390	6,615	15,101	7,101	9,914	9,177	3,718

### 3.4.4.3 Bycatch Issues and Data Associated with the Fishery

Bycatch in the recreational rod and reel fishery is difficult to quantify because many fishermen simply value the experience of fishing and may not be targeting a particular pelagic species. Recreational “marlin” or “tuna” trips may yield dolphin, tunas, wahoo, and other species, both undersized and legal sized. Bluefin tuna trips may yield undersized bluefin, or a seasonal closure may prevent landing of a bluefin tuna above a minimum or maximum size. Sharks may be discarded because they are a prohibited species or undersized. In these and similar cases, rod and reel catch may be discarded and the fish may be live or dead. The Magnuson-Stevens Act (16 USC 1802 MSA § 3 (2)) specifies that fish released under a recreational catch-and-release program are not considered bycatch. Bycatch can result in death or injury to discarded fish. Therefore, bycatch mortality is incorporated into fish stock assessments and into the evaluation of management measures. Rod and reel discard estimates from Virginia to Maine during June – October could be monitored through the expansion of survey data derived from the LPS (dockside and telephone surveys). However, the actual

numbers of fish discarded for many species are so low that presenting the data by area could be misleading, particularly if the estimates are expanded for unreported effort in the future. The number of kept and released sharks reported or observed through the LPS dockside intercepts for 1997 – 2008 is presented in Table 3.20.

An outreach program to address bycatch and to educate anglers on the benefits of circle hooks has been implemented by NMFS. One of the key elements of the outreach program is to provide information that leads to an improvement in post-release survival from recreational gear by encouraging recreational anglers to use circle hooks. Implementation of this outreach program began in 2007 with the distribution of DVDs to tournament operators showing the proper rigging and deployment of circle hooks with natural baits. This outreach program is anticipated to be expanded by NMFS in future years. Also, a final rule to require the mandatory use of circle hooks when fishing with natural baits in Atlantic, Gulf of Mexico, and U.S. Caribbean billfish tournaments was published in May 2007 (72 FR 26735, May 11, 2007) and became effective on January 1, 2008. As of publication of this report, NMFS has distributed over 9,000 copies of the circle hook DVDs.

**Table 3.20 Observed or reported number of Atlantic Sharks kept in the rod and reel fishery, Maine through Virginia, 2000 -2008.**

Source: Large Pelagic Survey (LPS) Preliminary Data.

Species	Number of Fish Kept								
	2000	2001	2002	2003	2004	2005	2006	2007	2008
Thresher Shark	2	5	20	24	58	45	34	62	59
Mako Shark	49	27	72	141	216	99	111	143	169
Sandbar Shark	1	2	0	9	7	1	1	9	1
Dusky Shark	0	0	1	1	0	0	3	6	1
Tiger Shark	0	1	1	0	0	1	0	1	1
Porbeagle	0	0	1	0	1	1	1	0	0
Blacktip Shark	0	1	0	1	0	1	1	0	-
Atlantic Sharpnose Shark	0	0	0	0	0	0	0	0	-
Blue Shark	12	2	36	65	74	67	61	109	43
Hammerhead Shark	1	2	0	0	1	0	0	0	1

**Table 3.21 Observed or reported number of Atlantic Sharks released in the rod and reel fishery, Maine through Virginia, 2000 -2008.**

Source: Large Pelagic Survey (LPS) Preliminary Data.

Species	Number of Fish Released Alive								
	2000	2001	2002	2003	2004	2005	2006	2007	2008
Thresher Shark	1	0	5	8	27	9	15	24	35
Mako Shark	114	65	120	208	350	142	177	190	242
Sandbar Shark	4	10	17	26	68	37	158	168	222
Dusky Shark	32	8	9	44	60	49	73	87	128
Tiger Shark	3	2	3	12	0	6	7	11	20
Porbeagle	0	0	14	3	1	6	8	2	2
Blacktip Shark	0	0	6	0	1	19	9	31	-
Atlantic Sharpnose Shark	0	0	0	0	0	11	0	0	-
Blue Shark	374	141	505	2,060	2,242	920	884	1,978	2,735
Hammerhead Shark	0	1	6	38	2	5	0	0	0

### 3.4.5 Fishery Data: Landings by Shark Species

The following tables of Atlantic HMS landings are taken from the 2009 National Report of the United States to ICCAT (ANN-043) (NMFS, 2009). The purpose of this section is to provide a summary of recent domestic landings of HMS by gear and species allowing for interannual comparisons. Landings for sharks were compiled from the most recent stock assessment documents and updates provided from the SEFSC.

**Table 3.22 Commercial landings of small coastal sharks in lb dw: 1999-2008.**  
 Source: Cortés and Neer, 2002, 2005; Cortés, 2003; Cortés pers. comm.

Small coastal sharks	2000	2001	2002	2003	2004	2005	2006	2007	2008
Atlantic Angel*	97	0	495	1,397	818	3,588	500	29	91
Blacknose	178,083	160,990	144,615	131,511	68,108	124,039	187,907	91,438	134,255
Bonnethead	69,411	63,461	36,553	38,614	29,402	33,408	33,911	53,638	60,970
Finetooth	202,572	303,184	185,120	163,407	121,036	109,774	80,536	138,542	80,833
Sharpnose, Atlantic	142,511	196,441	213,301	190,960	230,880	354,255	459,184	332,160	324,622
Sharpnose, Atlantic, fins	0	209	0	0	0	0	0	0	0
Sharpnose, Caribbean*	353	205	0	0	0	0	0	0	0
Unclassified Small Coastal	0	51	35,831	8,634	1,407	9,821	1,289	2,384	23,077
<b>Total (excluding fins)</b>	<b>593,027 (269 mt dw)</b>	<b>724,332 (329 mt dw)</b>	<b>615,915 (279 mt dw)</b>	<b>534,523 (242 mt dw)</b>	<b>451,651 (205 mt dw)</b>	<b>634,885 (288 mt dw)</b>	<b>763,327 (346 mt dw)</b>	<b>618,191 (280 mt dw)</b>	<b>623,848 (283 mt dw)</b>

\* indicates species that were prohibited in the commercial fishery as of June 21, 2000.

**Table 3.23 Commercial landings of pelagic sharks in lb dw: 1999-2008.**

Sources: Cortés and Neer 2002, 2005; Cortés 2003; Cortés pers. comm.

<b>Pelagic Sharks</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
Bigeye thresher*	4,376	330	0	0	719	267	68	0	0
Bigeye sixgill*	0	0	0	0	0	0	0	0	0
Blue shark	3,508	65	137	6,324	423	0	588	0	3,229
Mako, longfin*	6,560	9,453	3,008	1,831	1,827	403	2,198	2,042	1,896
Mako, shortfin	129,088	171,888	159,840	151,428	217,171	156,082	103,040	165,966	120,255
Mako, Unclassified	74,690	73,556	58,392	33,203	50,978	35,241	28,557	38,170	39,661
Oceanic whitetip	657	922	1,590	2,559	1,082	713	354	787	1,899
Porbeagle	5,272	1,152	2,690	1,738	5,832	2,452	3,810	3,370	5,259
Sevengill*	0	0	0	0	0	0	0	0	0
Sixgill*	0	0	0	0	0	0	0	0	0
Thresher	81,624	56,893	53,077	46,502	44,915	41,230	27,740	46,391	47,528
Unclassified, pelagic	233	0	5,965	79,439	0	0	571	0	0
Unclassified, assigned to pelagic	40,951	31,636	182,983	314,300	356,522	16,427	25,917	5,453	14,819
Unclassified, pelagic, fins	3,746	12,239	0	0	41	0	0	0	0
<b>Total (excluding fins)</b>	<b>350,705</b> <b>(159 mt dw)</b>	<b>345,895</b> <b>(157 mt dw)</b>	<b>467,682</b> <b>(212 mt dw)</b>	<b>637,324</b> <b>(289 mt dw)</b>	<b>679,469</b> <b>(308 mt dw)</b>	<b>252,815</b> <b>(115 mt dw)</b>	<b>192,843</b> <b>(87 mt dw)</b>	<b>262,179</b> <b>(119 mt dw)</b>	<b>234,546</b> <b>(106 mt dw)</b>

\* indicates species that were prohibited in the commercial fishery as of June 21, 2000.

**Table 3.24** The number of sharks and non-shark species that were discarded alive, discarded dead, and kept under the exempted fishing program during 2008, including exempted fishing permits, display permits, scientific research permits, and letters of acknowledgement. These numbers do not include fish that were reported in commercial logbooks.

Species	Number Discarded Alive	Number Discarded Dead	Number Kept	Total Number of Interactions
<i>Shark Species</i>				
Angel Shark	1			1
Atlantic Sharpnose Shark	535	402	1	938
Bignose	1			1
Blacknose Shark	39		8	47
Blacktip Shark	41	1	12	54
Bonnethead Shark	182	92	14	288
Bull Shark	5			5
Dusky Shark	12			12
Finetooth Shark	2			2
Florida Smoothhound Shark	36	2	1	39
Great Hammerhead Shark	2		1	3
Mako Shark			1	1
Night Shark	17	19		36
Nurse Shark	21		4	25
Sand Tiger Shark	9		2	11
Sandbar Shark	10			10
Scalloped Hammerhead Shark	7	4		11
Silky Shark	15	49		64
Spinner Shark	5			5
Thresher Shark	1			1
Tiger Shark	21			21
Unidentified Shark	4			4
<i>Non-Shark Species</i>				
Barracuda	1			1
Bigeye Tuna		2		2
Bluefin Tuna	47	29	3	79
Eagle Ray			2	2
Cobia	1			1
Humpback Whale	1			1
Little Tunny	2		5	7
Longbill Spearfish		6		6
Mahi Mahi		1	8	9
Manta Ray	2			2
Oilfish		1		1
Red Drum	2			2
Roundscale Spearfish		20	1	21
Southern Stingray	1			1
Swordfish	8	9	29	46
White Marlin		58		58
Yellowfin Tuna			2	2

**Table 3.25 Catch history for the Small Coastal Shark complex (numbers of fish).**  
 Sources: Modified from Table 2.2 in SEDAR 13 (NMFS, 2007b) and Cortés, pers. comm.

Year	Commercial				Recreational Catches <sup>1</sup>	Bottom Longline Discards	Shrimp Bycatch (GOM) <sup>2</sup>	Shrimp Bycatch (SA) <sup>2</sup>	EFP <sup>3</sup>	Total
	Total	Longline Discards	Nets	Lines						
1972							840,633	105,680		946,313
1973							233,634	29,371		263,005
1974							411,643	51,749		463,392
1975							872,930	109,740		982,670
1976							292,878	36,819		329,697
1977							946,230	118,955		1,065,185
1978							635,527	79,895		715,422
1979							933,737	117,384		1,051,121
1980							1,738,982	218,615		1,957,597
1981					82,759		1,736,376	218,287		2,037,422
1982					67,647		409,794	51,517		528,958
1983					84,677		674,421	84,784		843,882
1984					57,330		377,532	47,461		482,323
1985					50,313		476,828	59,944		587,085
1986					100,531		485,197	60,996		646,724
1987					93,982		1,040,738	130,836		1,265,556
1988					153,915		580,306	72,953		807,174
1989					100,295		603,506	75,869		779,670
1990					94,336		614,590	77,263		786,189
1991					149,180		891,723	112,102		1,153,005
1992					111,721		1,172,572	147,409		1,431,702
1993	262				91,559		509,360	64,034		665,216
1994	3,308				143,017		443,215	55,718		645,258
1995	139,569	57,819	80,791	627	167,481	22,607	1,051,681	132,211		1,513,549
1996	118,425	39,967	75,317	3,134	115,031	12,230	920,627	115,736		1,282,050
1997	214,221	29,527	181,922	1,723	99,792	12,106	703,350	88,421		1,117,891

Year	Commercial				Recreational Catches <sup>1</sup>	Bottom Longline Discards	Shrimp Bycatch (GOM) <sup>2</sup>	Shrimp Bycatch (SA) <sup>2</sup>	EFP <sup>3</sup>	Total
	Total	Longline Discards	Nets	Lines						
1998	187,931	22,044	163,396	2,397	117,039	17,547	806,300	101,363		1,230,180
1999	222,715	18,064	198,804	4,601	114,388	16,239	641,017	80,585		1,074,944
2000	168,544	24,689	141,425	2,377	198,361	24,220	796,602	100,144	11	1,287,883
2001	219,962	14,643	201,777	1,535	210,820	14,511	641,786	80,682		1,167,762
2002	173,847	25,133	146,719	1,949	152,475	18,171	1,104,353	138,833		1,587,680
2003	147,313	36,678	90,411	20,120	134,343	30,956	544,058	68,396	5	925,071
2004	133,937	35,741	97,080	1,374	126,963	29,665	797,000	101,330	1,872	1,190,768
2005	152,968	38,531	112,390	1,534	118,804	19,073	530,943	66,893	484	889,164
2006	170,312	55,476	112,520	1,945	117,188	40,797			484	328,781
2007	164,755	18,896	136,623	3,004	167,636	14,251			484	347,127
2008	186,196	25,211	138,760	1,700	107,884	5,231			484	299,795

### **3.5 HMS Permits and Tournaments**

This section provides updates for the number of permits that were issued in conjunction with HMS fishing activities. These are current through November 2009. Furthermore, Section 3.5.6 provides a comprehensive synthesis of recreational fishing tournaments and their role in the context of HMS management.

NMFS' HMS Management Division continues to monitor capacity in HMS fisheries. Updated permit numbers for HMS and non-HMS fisheries as of November 5, 2009 are included in Table 3.26. The overall number of HMS permits for Atlantic swordfish and sharks (directed and incidental) decreased between 2005 and 2009 (Table 3.26), however, these numbers are subject to change based upon on-going permit renewal or expiration.

**Table 3.26 Distribution of active Shark Directed and Incidental Permits and Other Permits Held by Shark Fishermen in Other Fisheries. Summarized by State as of November 5, 2009.**

State	SHK-Directed	SHK Incidental	SWO Directed	SWO Incidental/Handgear	GOM Reef Fish	Dolphin Wahoo	Mackerel:		Spiny Lobster	Snapper-Grouper	Non-HMS Charter Head Boat General*
							King	Spanish			
ME	1	1	1	0	0	1	0	0	0	0	0
NH	1	1	1	0	0	0	0	0	0	0	0
MA	5	14	13	3	0	11	0	3	1	0	0
RI	0	5	1	3	0	1	0	0	0	0	0
CT	1	2	1	0	1	1	0	0	0	0	0
NY	9	13	14	5	1	17	0	4	0	1	4
NJ	26	31	33	15	0	38	12	19	1	1	3
DE	0	1	1	0	0	1	0	0	0	0	0
MD	4	1	4	0	1	4	0	0	0	0	3
VA	2	2	1	2	0	3	1	1	0	1	0
NC	17	13	10	7	0	28	19	19	2	15	13
SC	4	12	3	1	0	14	9	3	0	12	3
GA	2	1	0	0	0	3	3	3	2	3	0
FL	139	138	68	37	93	179	127	162	15	75	124
AL	6	1	0	0	2	1	2	2	0	0	0
MS	0	4	0	0	1	0	3	2	0	0	0
LA	2	36	32	3	5	4	7	3	0	0	0
TX	2	6	0	3	8	3	5	1	0	0	2

State	SHK-Directed	SHK Incidental	SWO Directed	SWO Incidental/ Handgear	GOM Reef Fish	Dolphin Wahoo	Mackerel:		Spiny Lobster	Snapper-Grouper	Non-HMS Charter Head Boat General*
							King	Spanish			
<b>Total 2009</b>	<b>221</b>	<b>282</b>	<b>183</b>	<b>79</b>	<b>112</b>	<b>309</b>	<b>188</b>	<b>222</b>	<b>21</b>	<b>108</b>	<b>152</b>
<b>Total 2008</b>	<b>214</b>	<b>285</b>	<b>181</b>	<b>76</b>	<b>**</b>	<b>**</b>	<b>**</b>	<b>**</b>	<b>**</b>	<b>**</b>	<b>**</b>
<b>Total 2007</b>	<b>231</b>	<b>296</b>	<b>180</b>	<b>160</b>	<b>134</b>	<b>316</b>	<b>444</b> (King / Spanish Combined)		<b>54</b>	<b>119</b>	<b>193</b>
<b>Total 2006 ***</b>	<b>240</b>	<b>312</b>	<b>191</b>	<b>86</b>	<b>***</b>	<b>***</b>	<b>***</b>	<b>***</b>	<b>***</b>	<b>***</b>	<b>***</b>
<b>Total 2005 ***</b>	<b>235</b>	<b>320</b>	<b>190</b>	<b>91</b>	<b>***</b>	<b>***</b>	<b>***</b>	<b>***</b>	<b>***</b>	<b>***</b>	<b>***</b>

\* Non-HMS Charter Headboat (CHB) General includes: Atlantic CHB for dolphin/wahoo, South Atlantic (SA) CHB for pelagic fish, SA CHB for snapper/grouper, Gulf of Mexico (GOM) CHB for pelagic fish, and GOM CHB for reef fish.

\*\* 2008 numbers taken from 2008 SAFE Report. Not all permit totals are available.

\*\*\* Numbers for 2005 and 2006 were taken from the Consolidated HMS FMP. Non-HMS permits were not calculated at that time.

### **3.5.1 Upgrading and Safety Issues**

When the limited access program was implemented, NMFS included upgrading restrictions that were the same as those implemented by the NEFMC and MAFMC in order to help minimize the number of regulations for fishermen in those areas. These regulations restrict vessels from any increase over ten percent length overall (LOA), ten percent gross or net tonnage, and 20 percent horsepower. NMFS continued to receive comments that these vessel upgrading restrictions are not appropriate for longline fisheries, may inhibit full utilization of the domestic swordfish quota, are not the preferred vessel characteristics to limit overcapitalization, and have caused safety at sea concerns. In developing the current upgrading restrictions, hold capacity was identified by constituents as a vessel characteristic that would not impact safety at sea and would meet the objective of addressing overcapitalization in HMS commercial fisheries. NMFS did not implement hold capacity as a measure to limit vessel upgrading in 1999 due to the lack of standard measurements of vessel hold capacity as well as the lack of consistent collection of this information for HMS commercial vessels as part of existing vessel registration systems. NMFS considered other possible options including: eliminating upgrading restrictions; limiting hold capacity instead of, or in addition to, the current restrictions; allowing a greater percentage increase; and creating vessel categories. NMFS heard similar comments as those listed above from the HMS AP in March of 2007.

On June 7, 2007, NMFS published a final rule which modified HMS limited access vessel upgrading restrictions for vessels concurrently issued certain HMS permits (72 FR 31688). According to this rule, effective August 6, 2007, HMS limited access vessel upgrading restrictions are modified, but only for vessels that concurrently possess, or are eligible to renew, on August 6, 2007, incidental or directed swordfish and shark permits, as well as an Atlantic Tunas Longline category permit. These vessels may be upgraded, or permits transferred, so long as the upgrade or permit transfer does not result in an increase in vessel size (LOA, gross registered tonnage (GRT), and net tonnage (NT)) of more than 35 percent, relative to the vessel first issued the HMS LAP. Also, all horsepower upgrading restrictions for these vessels are removed by the rule. In addition, effective July 9, 2007, restrictions specifying that a vessel may be upgraded only once were removed for all HMS LAPs. NMFS provided additional information to LAP holders regarding eligibility for the modified vessel upgrading restrictions in a subsequent notice.

### **3.5.2 HMS CHB Permits**

In 2002, NMFS published a final rule (67 FR 77434, December 18, 2002) expanding the HMS recreational permit from tuna only to include all HMS and define CHB operations. This established a requirement that owners of charterboats or headboats that are used to fish for, take, retain, or possess Atlantic tunas, sharks, swordfish, or billfish must obtain a HMS CHB permit. This permit replaced the Atlantic Tunas CHB permit. A vessel issued a HMS CHB permit for a fishing year will not be issued an HMS Angling permit or any Atlantic Tunas permit in any category for that same fishing year, regardless of a change in the vessel's ownership. The total number of CHB fluctuated between 2006 and 2009 (Table 3.27).

**Table 3.27 Atlantic HMS CHB Permits by State (Principle State on Registration) in 2009.**

State	Atlantic HMSCHB permits	State	Atlantic HMS CHB Permits
AL	74	NH	53
CT	87	NJ	562
DE	95	NY	319
FL	682	PA	6
GA	26	PR	31
LA	81	RI	160
MA	728	SC	162
MD	161	TX	170
ME	110	VA	122
MS	26	VI	20
NC	462	Other	13
<b>Total (2009)</b>			<b>4,150</b>
<b>Total (2008)</b>			<b>4,837</b>
<b>Total (2007)</b>			<b>3,899</b>
<b>Total (2006)</b>			<b>4,173</b>

### 3.5.3 HMS Angling Permits

Effective March 2003 (67 FR 77434, December 18, 2002), the HMS Angling category permit allows all recreational anglers aboard permitted vessels to fish for HMS and is required to fish for, retain, or possess, including catch and release fishing, any federally regulated HMS. These species include: sharks, swordfish, white and blue marlin, sailfish, spearfish, and federally regulated Atlantic tunas (bluefin, yellowfin, bigeye, skipjack, and albacore). Atlantic HMS caught, retained, possessed, or landed by persons on board vessels with an HMS Angling permit may not be sold or transferred to any person for a commercial purpose. By definition, recreational landings of Atlantic HMS are those that cannot be marketed through commercial channels, therefore it is not possible to monitor anglers' catches through ex-vessel transactions as in the commercial fishery. Instead, NMFS conducts statistical sampling surveys of the recreational fisheries. These survey programs have been used for over a decade and include the MRFSS and the LPS. A vessel issued an HMS Angling permit for a fishing year shall not be issued an HMS Charter/Headboat permit or an Atlantic Tunas permit in any category for that same fishing year, regardless of a change in the vessel's ownership.

**Table 3.28 HMS Angling Permits by State (Principle State on Registration) in 2009.**

State	Atlantic HMS Angling Permits	State	Atlantic HMS Angling Permits
AL	452	NJ	3543
CT	687	NY	1785
DE	970	OH	14
FL	4334	PA	245
GA	146	PR	735
LA	679	RI	692
MA	3802	SC	908
MD	1308	TN	22
ME	482	TX	800
MI	20	VA	1045
MS	230	VI	59
NC	2002	VT	27
NH	392	Other	126
<b>Total (2009)</b>			<b>25,505</b>
<b>Total (2008)</b>			<b>32,934</b>
<b>Total (2007)</b>			<b>24,220</b>
<b>Total (2006)</b>			<b>25,238</b>

### 3.5.4 Dealer Permits

Dealer permits are required for commercial receipt of Atlantic tuna, swordfish, and sharks, and are described in further detail in the 1999 FMP for Atlantic Tunas, Swordfish, and Sharks. Shark dealers are also required to attend shark identification workshops as of December 31, 2007. Dealer permits are not limited access. Fishermen caught selling HMS to unpermitted dealers and persons without a dealer permit buying HMS from fishermen could be subject to enforcement action. Similarly, persons caught buying HMS from non-commercial fishermen could also be subject to enforcement action. All dealer permit holders are required to submit reports detailing the nature of their business. For swordfish and shark permit holders (including those who *only* import swordfish), dealers must submit bi-weekly dealer reports on all HMS they purchase. Tuna dealers must submit, within 24 hours of the receipt of a bluefin tuna, a landing report for each bluefin purchased from U.S. fishermen. Dealers must also submit bi-weekly reports that include additional information on tunas that they purchase. To facilitate quota monitoring “negative reports” for shark and swordfish are also required from dealers when no purchases are made (*i.e.*, NMFS can determine who has not purchased fish versus who has neglected to report). As of November 6, 2009, there were 105 permitted shark dealers (Table 3.29). NMFS continues to automate and improve its permitting and dealer reporting systems and plans to make additional permit applications and renewals available online in the near future.

**Table 3.29 Number of active shark dealer permits and other permits held by shark dealers by state as of November 6, 2009.**

State	Sharks	Domestic Swordfish	Dolphin/Wahoo	Reef Fish	Rock Shrimp	Snapper/Grouper	Golden Crab	Wreckfish	Total # of Other Permits
AL	3	1	2	3	0	1	0	0	7
FL	39	27	21	26	10	25	9	8	126
GA	1	1	1	0	1	1	0	1	5
LA	7	6	4	6	0	5	0	0	21
MA	7	7	7	1	1	2	1	1	20
MD	3	3	3	0	0	1	0	1	8
ME	2	2	2	0	0	1	0	0	5
NC	5	4	5	1	2	5	1	2	20
NJ	10	9	9	1	1	2	0	1	23
NY	4	4	2	1	1	2	1	2	13
RI	4	4	4	0	0	1	0	1	10
SC	14	4	6	0	0	6	0	1	17
TX	2	1	1	2	0	1	0	0	5
VA	4	4	4	0	0	3	0	2	13
<b>Totals (2009)</b>	<b>105</b>	<b>77</b>	<b>71</b>	<b>41</b>	<b>16</b>	<b>56</b>	<b>12</b>	<b>20</b>	<b>293</b>

### **3.5.5 Exempted Fishing Permits (EFPs), Display Permits, Chartering Permits, and Scientific Research Permits (SRPs)**

EFPs, display permits, LOAs and SRPs are issued under the authority of the Magnuson-Stevens Act (MSA) (16 U.S.C. 1801 *et seq.*) and/or Atlantic Tunas convention Act (ATCA) (16 U.S.C. 971 *et seq.*). EFPs are issued to individuals for the purpose of conducting research or other fishing activities using private (non-NOAA) vessels, whereas an SRP would be issued to agency scientists who are using NOAA vessels as their research platform. Similar to SRPs, LOAs are issued to individuals conducting research from “bona fide” research vessels on species that are only regulated by Magnuson-Stevens Act and not ATCA. NMFS does request research plans for these activities and indicates concurrence by issuing an LOA. Display permits are issued to individuals who are fishing for, catching, and then transporting HMS to certified aquariums for public display. Regulations at 50 CFR 600.745 and 50 CFR 635.32 govern scientific research activity, exempted fishing, and exempted educational activity with respect to Atlantic HMS. The 2003 Amendment 1 to the Atlantic Tunas, Swordfish, and Sharks FMP implemented and created a separate display permitting system, which operates apart from the exempted fishing activities that are focusing on scientific research. The application process for display permits is similar to that required for EFPs and SRPs. When NMFS implemented Amendment 2 to the 2006 Consolidated HMS FMP (73 FR 35788 June, 24 2008), the shark quota for EFPs, display permits, and SRPs remained the same. However, the quota for sandbar shark was reduced to 1.39 mt. authorized for display and 1.39 mt authorized for research under EFPs and SRPs.

Amendment 2 to the Consolidated HMS FMP also implemented a shark research fishery. This research fishery is conducted under the auspices of the exempted fishing program. Research fishery permit holders assist NMFS in collecting valuable shark life history data and data for future shark stock assessments. Fishermen must fill out an application for a shark research permit under the exempted fishing program to participate in the shark research fishery. In 2008, NMFS received 25 applications from 17 applicants. Of the 15 qualified applicants, 11 were chosen to participate in the shark research fishery. Shark research fishery participants are subject to 100 percent observer coverage in addition to other terms and conditions.

Issuance of EFPs, display permits, and SRPs may be necessary because possession of certain shark and billfish species are otherwise prohibited, possession of billfishes onboard commercial fishing vessels is prohibited, the commercial fisheries for bluefin tuna, swordfish and large coastal sharks may be closed for extended periods during which collection of live animals and/or biological samples would otherwise be prohibited, or for other reasons. These EFPs, SRPs, and display permits would authorize collections of tunas, swordfish, billfishes, and sharks from Federal waters in the Atlantic Ocean and Gulf of Mexico for the purposes of scientific data collection and public display. In addition, NMFS regulations at 50 CFR 635.32 regarding implantation or attachment of pop-up satellite archival tags in Atlantic HMS require prior authorization and a report on implantation activities.

In order to implement the chartering recommendations of the International Commission for the Conservation of Atlantic Tunas (ICCAT), NMFS published a rule on December 6, 2004 (69 FR 70396), requiring U.S. vessel owners with HMS permits to apply for and obtain a

chartering permit before fishing under a chartering arrangement outside U.S. waters. These permits are issued in a manner similar to other EFPs. Under this final rule and consistent with the ICCAT recommendations, vessels issued a chartering permit are not authorized to use the quota or entitlement of the United States until the chartering permit expires or is terminated. This is because of the fact that under a chartering arrangement that U.S. vessels have attained authorization to harvest another ICCAT Contracting Parties' quota. Having a chartering permit does not obviate the need to obtain a fishing license, permits, or other authorizations issued by the chartering nation in order to fish in foreign waters, or obtain other authorizations such as a High Seas Fishing Compliance Act Permit, 50 CFR 300.10 *et seq.* A U.S. vessel shall not be authorized to fish under more than one chartering arrangement at the same time. NMFS will issue chartering permits only if it determines that the chartering arrangement is in conformance with ICCAT's conservation and management programs. Due to interest from the commercial industry, NMFS is currently considering changes to the vessel chartering regulations to potentially allow catches taken under a chartering arrangement to count against the Atlantic HMS quota. The number of EFPs, display permits, and SRPs issued from 2003 – 2008 by category and species are listed in Table 3.30.

**Table 3.30** Number of Exempted Fishing Permits (EFPs), Display Permits, Scientific Research Permits (SRPs), Letters of Acknowledgement (LOAs) issued between 2003 and 2009.

Permit type		2003	2004	2005	2006	2007	2008	2009
EFPs	Sharks for display	8	8	6	7	6	5	4
	HMS for display	1	1	1	1	2	1	2
	Tunas for display	0	1	0	--	--	0	0
	Shark research on a non-scientific vessel	9	6	5	7	4	4	4
	Tuna research on a non-scientific vessel	5	11	7	5	4	5	4
	HMS research on a non-scientific vessel	18	5	3	4	7	7	5
	Billfish research on a non-scientific vessel	0	1	2	3	2	3	1
	Shark Fishing	1	0	0	--	--	0	0
	HMS Chartering	0	1	0	--	--	0	0
	Tuna Fishing	7	2	0	5	--	0	0
	<b>TOTAL</b>	<b>49</b>	<b>36</b>	<b>24</b>	<b>32</b>	<b>25</b>	<b>25</b>	<b>20</b>
SRPs	Shark research	1	3	4	2	2	0	4
	Tuna research	0	0	0	--	1	0	0
	Billfish research	0	0	0	1	--	0	0
	HMS (multi-species) research	1	1	4	4	1	1	0
	<b>TOTAL</b>	<b>2</b>	<b>4</b>	<b>8</b>	<b>7</b>	<b>4</b>	<b>1</b>	<b>4</b>
LOAs	Shark research	3	2	4	5	7	6	5
	<b>TOTAL</b>	<b>3</b>	<b>2</b>	<b>4</b>	<b>5</b>	<b>7</b>	<b>6</b>	<b>5</b>

### 3.5.6 Atlantic HMS Tournaments

Fishing tournaments are an important component of HMS recreational fisheries. A tournament is defined in the HMS regulations as any fishing competition involving Atlantic HMS in which participants must register or otherwise enter or in which a prize or award is offered for catching or landing HMS. Since 1999, Federal regulations have required that each HMS tournament operator register their tournament with NMFS at least four weeks prior to the commencement of tournament fishing activities. Tournament operators may be selected for reporting and, if selected, must submit tournament results to NMFS within seven days of the conclusion of the tournament.

Tournament registration and reporting is necessary because it provides an important source of information used to assess HMS fish stocks and to estimate the annual catch of Atlantic HMS. The information may be used by NMFS to plan for the assignment of tournament observers to assist in catch/effort data compilation and to obtain biological data and samples from landed fish (length/weight, stomach contents, injuries, parasites, hard and soft tissue samples for age determination, genetic and microconstituent analysis, spawning condition, fecundity, *etc.*). Additionally, with an accurate tournament database, NMFS may better assess the practicality of using tournaments for angler educational outreach efforts including distribution of written informational materials, notification of public hearings, and explanation of HMS regulations. HMS tournament registration and reporting information further allows NMFS, in the course of developing fishery management plans, to evaluate the social and economic impact of tournament angling in relation to other types of angling (*e.g.*, commercial, non-tournament recreational, *etc.*) and the relative effect of tournament angling on populations of various regulated HMS. Finally, the information is essential for the U.S. to meet its reporting obligations to ICCAT.

When registering an HMS tournament, the following information is required to be submitted to the HMS Management Division in St. Petersburg, FL: (1) Tournament name; (2) tournament location; (3) name, address, phone number, fax number, and e-mail address of tournament operator; (4) fishing dates; and (5) HMS species for which points or prizes are awarded. If selected for reporting, operators must submit the following information to the SEFSC: (1) Tournament name; (2) tournament dates; (3) tournament location; (4) number of boats fishing; (5) hours fished; (6) recorder's name, phone number, and e-mail address; (7) the number of each species kept; (8) the number of each species lost; (9) the number of each species tagged and released; (10) the number of each species released without a tag; (11) the number of each species released dead; and, (12) the weight and length of all fish boated. This information is routinely collected during tournament operations to award prizes. Generally, 100 percent of all billfish tournaments are selected for reporting, as this information is critical to determining billfish landings. Tournament registration forms are available at: [http://www.nmfs.noaa.gov/sfa/hms/linkpages/reporting\\_forms.htm](http://www.nmfs.noaa.gov/sfa/hms/linkpages/reporting_forms.htm).

NMFS estimates that fewer than 300 HMS fishing tournaments occur annually along the U.S. Atlantic coast, including the Gulf of Mexico and Caribbean (NMFS Atlantic HMS Tournament Registration Database). These tournaments range from smaller, club member-only events with as few as ten participating boats (40 - 60 anglers) to larger, statewide tournaments with 250 or more participating vessels (1,000 – 1,500 anglers). For the larger tournaments,

corporate sponsorship from tackle manufactures, marinas, boat dealers, beverage distributors, resorts, publications, chambers of commerce, restaurants, and others are often involved. Also, some tournaments are components of larger series, including state Governors Cups (North Carolina, South Carolina), the World Billfish Series, and the MTU (Detroit Diesel) Legend Series, among others.

Many HMS fishing tournaments promote strict conservation principles in their rules. For example, minimum sizes for fish that are landed are often larger than state and federal requirements. Also, some tournaments prohibit treble hooks and may require circle hooks on certain baits. Because tournament participants are often well-respected anglers (*i.e.* highliners), these conservation trends and ethics likely influence the general angling population in a positive manner. Many HMS fishing tournaments support charitable organizations.

Table 3.31 presents the total number of registered HMS tournaments, by state, between 2001 and 2008. This table indicates that, in 2008, HMS fishing tournaments were conducted most frequently in Florida, Louisiana, Texas, New Jersey, Puerto Rico, North Carolina, South Carolina, New York, and Maryland. By far, the largest number of registered HMS tournaments has consistently occurred in Florida.

**Table 3.31** Number of Registered HMS Tournaments by State between 2001 and 2008.  
Source: NMFS Atlantic HMS Tournament Registration Database.

STATE	2001	2002	2003	2004	2005	2006	2007	2008
ME	2	3	3	5	3	5	5	4
NH	0	0	0	0	0	0	0	0
MA	7	1	7	10	4	7	10	10
RI	2	2	3	3	2	2	2	2
CT	1	0	0	0	1	1	0	1
NY	5	4	14	14	10	12	13	13
NJ	11	5	18	17	16	19	17	20
DE	2	0	0	1	0	0	1	1
MD	4	2	14	14	14	13	11	13
VA	5	1	5	4	5	4	6	5
NC	11	5	15	16	18	17	17	16
SC	6	3	13	9	9	12	13	16
GA	6	1	12	3	13	11	11	10
FL	46	26	66	57	74	83	97	80
AL	7	7	9	8	7	8	10	8
MS	3	2	7	2	2	1	1	1
LA	19	0	20	22	26	20	24	24
TX	14	1	17	10	17	17	33	21
PR	16	4	13	17	22	19	20	19
USVI	9	0	6	1	10	7	7	2
Bahamas <sup>1</sup>	3	2	1	2	2	1	1	1

STATE	2001	2002	2003	2004	2005	2006	2007	2008
Bermuda <sup>1</sup>	0	0	0	0	1	0	0	0
Mexico <sup>1</sup>	1	0	0	0	0	0	0	0
Turks/Caicos <sup>1</sup>	0	0	1	0	0	0	0	0
<b>TOTAL</b>	<b>181</b>	<b>68</b>	<b>244</b>	<b>215</b>	<b>256</b>	<b>259</b>	<b>299</b>	<b>267</b>

<sup>1</sup>Some foreign tournaments voluntarily registered because the participants were mostly U.S. citizens.

Table 3.32 shows the number and percentage of HMS tournaments awarding points or awards for a particular HMS, based upon 2006 and 2008 tournament registrations. Blue marlin, white marlin, sailfish, and yellowfin tuna have consistently been the predominant target species in HMS fishing tournaments. Bluefin tuna, swordfish, and pelagic sharks are also frequently targeted in HMS tournaments.

From 2006 – 2008, the overall number of registered tournaments peaked in 2007. The drop in the number of tournaments in 2008 is likely due to a variety of economic factors including the rise in fuel costs. The large percentage drop is quite evident in the billfish tournaments.

**Table 3.32 Number and Percent of All HMS Tournaments Awarding Points or Prizes for a HMS, 2006-2008.**

Source: NMFS Atlantic HMS Tournament Registration Database

Species	Number of Tournaments			Percent of Tournaments*		
	2006	2007	2008	2006	2007	2008
Blue Marlin	173	201	153	67%	67%	57%
Sailfish	164	186	148	63%	62%	55%
White Marlin	163	184	136	63%	62%	51%
Yellowfin Tuna	144	168	152	56%	56%	57%
Bluefin Tuna	78	93	90	30%	31%	34%
Swordfish	74	83	90	29%	28%	34%
Pelagic Sharks	67	59	60	26%	20%	23%
Bigeye Tuna	42	53	56	16%	18%	21%
Albacore Tuna	20	29	28	8%	10%	11%
Ridgeback Sharks	13	21	14	5%	7%	5%
Non-Ridgeback Sharks	10	21	10	4%	7%	4%
Skipjack Tuna	7	11	24	3%	4%	9%
Small Coastal Sharks	6	10	7	2%	3%	3%

\*Species targeted by tournaments are not mutually exclusive categories; therefore, a sum of percentages by year will not equal 100%.

Table 3.33, Table 3.34, and Table 3.35 indicate the percentage and number of 2008 HMS registered tournaments, by state, for pelagic, LCS (ridgeback and non-ridgeback), and SCS, respectively. These tables indicate that the Louisiana/Texas, Florida, New York/New Jersey, and Massachusetts/Maine areas are the primary areas for pelagic shark fishing tournaments. LCS and SCS fishing tournaments are conducted less frequently.

**Table 3.33 Registered Pelagic Shark Tournaments, 2008.**  
 Source: NMFS Atlantic HMS Tournament Registration Database.

State	Number of 2008 Tournaments Awarding Points or Prizes for Pelagic Sharks	Percent of Total 2008 Tournaments Awarding Points or Prizes for Pelagic Sharks
Louisiana	18	30%
New York	11	18%
New Jersey	10	17%
Massachusetts	4	7%
Maine	4	7%
Florida	4	7%
Maryland	3	5%
Rhode Island	2	3%
Connecticut	1	2%
North Carolina	1	2%
South Carolina	1	2%
Texas	1	2%
<b>TOTAL</b>	<b>60</b>	<b>100%*</b>

\*Detail may not sum to total because of rounding.

**Table 3.34 Registered Large Coastal Shark (ridgeback and non-ridgeback) Tournaments, 2008.**  
 Source: NMFS Atlantic HMS Tournament Registration Database.

State	Number of 2008 Tournaments Awarding Points or Prizes for Large Coastal Sharks	% of Total 2008 Tournaments Awarding Points or Prizes for Large Coastal Sharks
Florida	5	33%
Texas	3	20%
Maryland	2	13%
New York	2	13%
New Jersey	1	7%
North Carolina	1	7%
South Carolina	1	7%
<b>TOTAL</b>	<b>15</b>	<b>100%</b>

**Table 3.35 Registered Small Coastal Shark Tournaments, 2008.**  
 Source: NMFS Atlantic HMS Tournament Registration Database.

State	Number of 2008 Tournaments Awarding Points or Prizes for Small Coastal Sharks	% of Total 2008 Tournaments Awarding Points or Prizes for Small Coastal Sharks
Florida	2	29%
New Jersey	2	29%
North Carolina	1	14%
South Carolina	1	14%
Texas	1	14%
<b>TOTAL</b>	<b>7</b>	<b>100%</b>

### 3.6 Economic Status of HMS Shark Fisheries

The review of each rule, and of Atlantic HMS fisheries as a whole, is facilitated when there is an economic baseline against which the rule or fishery may be evaluated. In this analysis, NMFS used the past eight years of data to facilitate the analysis of trends. It also should be noted that all dollar figures are reported in nominal dollars (*i.e.*, current dollars). If analysis of real dollar (*i.e.*, constant dollar) trends controlled for inflation is desired, price indexes for 2001 to 2008 are provided in Table 3.36. To determine the real price in base year dollars, divide the base year price index by the current year price index, and then multiply the result by the price that is being adjusted for inflation. From 2001 to 2008, the Consumer Price Index (CPI-U) indicates that prices have risen by 21.6 percent, the Gross Domestic Product (GDP) Implicit Price Deflator indicates that prices have risen 19.8 percent, and the Producer Price Index (PPI) for unprocessed finfish indicates a 71.3 percent rise in prices. From 2006 to 2007, the CPI, GDP Deflator, and the PPI for unprocessed finfish indicate prices changed by 2.8 percent, 2.8 percent, and -4.9 percent respectively. From 2007 to 2008, the CPI, GDP Deflator, and the PPI for unprocessed finfish indicate prices changed by 3.9 percent, 2.2 percent, and -5.2 percent respectively.

**Table 3.36**

**Inflation Price Indexes. The CPI-U is the standard Consumer Price Index for all urban consumers (1982-1984=100) produced by U.S. Department of Labor Bureau of Labor Statistics.**

The source of the Producer Price Index (PPI) for unprocessed finfish (1982=100) is also the Bureau of Labor Statistics. The Gross Domestic Product Implicit Price Deflator (2000=100) is produced by the U.S. Department of Commerce Bureau of Economic Analysis and obtained from the Federal Reserve Bank of St. Louis (<http://www.stlouisfed.org/>).

Year	CPI-U	GDP Deflator	PPI Unprocessed Finfish
1996	156.9	93.8	185.5
1997	160.5	95.4	165.7
1998	163	96.5	170.7
1999	166.6	97.9	191.7
2000	172.2	100.0	182.4
2001	177.1	102.4	176.1
2002	179.9	104.2	201.5
2003	184	106.4	195.8
2004	188.9	109.4	224.1
2005	195.3	113.0	253.1
2006	201.6	116.0	334.6
2007	207.3	119.8	318.1
2008	215.3	108.5	301.6

### 3.6.1 Commercial Fisheries

In 2006, the total commercial shark landings at ports in the 50 states by U.S. fishermen were valued at \$8.6 million. In 2007, the total commercial shark landings at ports in the 50 states by U.S. fishermen were valued at \$4.3 million. The 2007 ex-vessel price indicated that prices for shark fins dropped by about 25%, while the weight of fins dropped by a third. Furthermore, landings by weight for LCS and SCS dropped 40 percent and 20 percent, respectively, all contributing to a significant drop in shark fishery revenue. For a summary of all pricing, see Table 3.37.

#### 3.6.1.1 Ex-Vessel Prices

The average ex-vessel prices per pound dw for 1996-2008 by shark species complex and area are summarized in Table 3.37. In this table, prices are reported in nominal dollars. The ex-vessel price depends on a number of factors including the quality of the fish (*e.g.*, freshness, fat content, method of storage), the weight of the fish, the supply of fish, and consumer demand.

**Table 3.37 Average ex-vessel prices per lb (in U.S. dollars) for shark by area.**

Species	Area	1996	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
LCS	Gulf of Mexico	0.21	0.56	0.43	0.44	0.36	0.38	0.37	0.46	0.43	0.51	0.60
	S. Atlantic	1.02	1.10	0.78	1.12	1.27	0.39	0.44	0.50	0.40	0.45	0.51
	Mid-Atlantic	0.55	0.59	0.53	1.09	1.56	1.62	1.93	1.75	1.71	0.64	0.66
	N. Atlantic	0.88	0.77	1.01	1.02	0.77	0.72	0.70	0.74	1.02	0.70	-
Pelagic sharks	Gulf of Mexico	-	1.36	1.31	1.42	1.11	1.13	1.08	1.12	1.21	1.17	1.26
	S. Atlantic	0.62	0.83	0.76	0.68	0.67	0.71	0.65	0.73	0.72	0.86	0.86
	Mid-Atlantic	1.21	1.23	1.20	1.09	1.17	1.21	1.29	1.39	1.38	1.39	1.20
	N. Atlantic	1.31	0.81	1.10	1.23	1.00	1.12	1.46	1.40	1.26	0.97	0.93
Small coastal sharks	Gulf of Mexico	-	0.55	0.52	0.58	0.48	0.40	0.45	0.55	0.53	0.51	0.54
	S. Atlantic	0.25	0.50	0.48	0.52	0.53	0.51	0.61	0.62	0.55	0.63	0.65
	Mid-Atlantic	0.25	0.47	0.38	0.55	0.48	0.38	0.44	0.42	0.45	0.73	0.48
	N. Atlantic	-	-	-	1.51	0.58	-	-	0.50	-	-	-
Shark fins	Gulf of Mexico	-	14.01	15.99	20.90	22.64	18.12	17.93	20.24	20.76	15.12	18.11
	S. Atlantic	10.74	11.10	14.16	18.43	17.10	15.85	14.57	16.12	16.30	12.55	11.23
	Mid-Atlantic	4.60	3.41	4.90	-	-	-	-	-	-	-	3.74
	N. Atlantic	2.69	1.19	6.83	-	-	-	-	-	-	-	3.00

The average ex-vessel price for large coastal sharks (LCS) increased in all regions in 2008. The average ex-vessel prices for pelagic sharks decreased in the Mid-Atlantic and North Atlantic regions in 2008. The average ex-vessel prices for small coastal sharks (SCS) increased from 2007 to 2008 in the South Atlantic and Gulf of Mexico regions, but decreased in the Mid-Atlantic region. Gear type did not consistently affect the ex-vessel price of small coastal sharks in 2008. There were major changes to the shark fishery in 2008. It was the first year that fins were required to be naturally attached to sharks. Fishermen commented that meat prices would be affected by this change. However, the ex-vessel price data for shark meat in 2008 did not indicate any decreasing trends in shark meat prices. NMFS will continue to monitor market prices to determine the impacts from the fins on requirement. Shark fin prices increased in the Gulf of Mexico, but decreased in the South Atlantic (Table 3.37).

### ***3.6.1.2 Revenues***

Table 3.38 summarizes the average annual revenues of the shark fisheries based on average ex-vessel prices and the weight reported landed as per the U.S. National Report (NMFS, 2004a, 2008c, 2009), the Shark Evaluation Reports (NMFS, 1997b), and information given to ICCAT (Cortés and Neer, 2005). These values indicate that the estimated total annual revenue of shark fisheries between 2000 and 2007 peaked in 2002, and then steadily decreased until 2007, excluding the small peak in 2006. From 2007 to 2008, the annual revenues from shark decreased by 30 percent. This is a continuation of the trend from the previous year, where revenues declined by 50 percent. There were some large regulatory changes in the shark fishery in 2008. The fishery was closed for half of the year and when it opened the trip limit went from 4,000 pounds to a 33 fish limit with no sandbar retention allowed. It is also worth noting that 2007 saw a large decrease in revenues because of large overharvests in 2006, which dramatically reduced the fishing season in 2007. Given these changes, the decreases in large coastal shark revenues in 2007 and 2008 were expected. A similar decline in revenues did not occur in the pelagic or small coastal shark fisheries.

**Table 3.38** Estimates of the total ex-vessel annual revenues of Atlantic shark fisheries.

Sources: NMFS, 1997b; NMFS 2008c; Cortés, 2003; Cortés and Neer, 2002, 2005; Cortés, pers.comm.

Species		2000	2001	2002	2003	2004	2005	2006	2007	2008
Large coastal sharks	Ex-vessel \$/lb dw	\$0.68	\$0.91	\$0.99	\$0.78	\$0.86	\$0.86	\$0.89	\$0.58	\$0.61
	Weight lb dw	3,713,125	3,414,967	4,151,594	4,292,403	3,213,896	3,306,583	3,852,124	2,308,018	1,362,904
	Fishery Revenue	\$2,524,925	\$3,107,620	\$4,110,078	\$3,348,074	\$2,763,951	\$2,843,661	\$3,428,390	\$1,338,650	\$831,371
Pelagic sharks	Ex-vessel \$/lb dw	\$1.09	\$1.11	\$0.99	\$1.04	\$1.12	\$1.16	\$1.14	\$1.10	\$1.07
	Weight lb dw	350,705	345,895	467,682	637,324	679,469	235,600	185,266	263,765	234,546
	Fishery Revenue	\$382,268	\$383,943	\$463,005	\$662,817	\$761,005	\$273,296	\$211,203	\$290,142	\$250,964
Small coastal sharks	Ex-vessel \$/lb dw	\$0.46	\$0.79	\$0.52	\$0.43	\$0.50	\$0.52	\$0.51	\$0.63	\$0.55
	Weight lb dw	593,027	724,332	615,915	534,523	451,651	650,202	823,353	654,099	623,848
	Fishery Revenue	\$272,792	\$572,222	\$320,276	\$229,845	\$225,826	\$338,105	\$419,910	\$412,082	\$343,116
Shark fins (weight = 5% of all sharks landed)	Ex-vessel \$/lb dw	\$10.47	\$19.67	\$19.87	\$17.09	\$16.25	\$18.18	\$18.53	\$13.84	\$13.76
	Weight lb dw	232,843	224,260	261,760	273,213	217,251	209,619	243,037	161,294	111,065
	Fishery Revenue	\$2,437,865	\$4,411,188	\$5,201,162	\$4,669,202	\$3,530,326	\$3,810,878	\$4,503,478	\$2,232,310	\$1,528,253
<b>Total sharks</b>	<b>Fishery Revenue</b>	<b>\$5,617,851</b>	<b>\$8,474,974</b>	<b>\$10,094,521</b>	<b>\$8,909,938</b>	<b>\$7,281,107</b>	<b>\$7,265,940</b>	<b>\$8,562,982</b>	<b>\$4,273,185</b>	<b>\$2,953,705</b>

Note: Average ex-vessel prices may have some weighting errors.

### 3.6.1.3 Wholesale Market

Currently, NMFS does not collect wholesale price information from dealers. However, the wholesale price of some fish species is available off the web ([http://www.st.nmfs.gov/st1/market\\_news/index.html](http://www.st.nmfs.gov/st1/market_news/index.html)). The wholesale prices presented in Table 3.39 are from the annual reports of the Fulton Fish Market. As with ex-vessel prices, wholesale prices depend on a number of factors including the quality of the fish, the weight of the fish, the supply of fish, and consumer demand.

As reported by the Fulton Fish Market, Table 3.39 indicates that the average wholesale price of shark sold in Atlantic and Gulf of Mexico states decreased from 1996 to 2004 for the shortfin mako shark. Prices for other shark species have appeared to have rebounded in 2004, when compared to 1996.

**Table 3.39** The overall average wholesale price per lb of fresh HMS sold in Atlantic and Gulf of Mexico states as reported by the Fulton Fish Market.  
Source: NMFS, 2004c.

Species	1996 Price/lb	1999 Price/lb	2000 Price/lb	2001 Price/lb	2002 Price/lb	2003 Price/lb	2004 Price/lb
Blacktip	\$1.05	\$1.04	\$1.04	\$1.05	\$1.00	\$1.33	\$1.08
Shortfin mako	\$2.77	\$2.74	\$3.18	\$3.00	\$2.00	\$2.37	\$2.24
Thresher	\$1.00	\$0.91	\$0.82	\$1.25	\$1.25	\$0.78	\$1.24

### 3.6.2 Recreational Fisheries

An economic survey done by the U.S. Fish and Wildlife Service in 2006 found that for the entire United States 7.7 million saltwater anglers (including anglers in state waters) went on approximately 67 million fishing trips and spent approximately \$8.9 billion (USFWS, 2006). These participation rates are down from the 2001 survey which found 9.1 million saltwater anglers (including anglers in state waters) went on approximately 72 million fishing trips and spent approximately \$8.4 billion (USFWS, 2001). The 2006 survey found saltwater anglers spent \$5.3 billion on trip-related costs and \$3.6 billion on equipment (USFWS, 2006). Expenditure on trip-related costs increased 17 percent from 2001, but equipment expenditures have declined 7 percent. These expenditures included lodging, transportation to and from the coastal community, vessel fees, equipment rental, bait, auxiliary purchases (*e.g.*, binoculars, cameras, film, foul weather clothing), and fishing licenses. Approximately 79 percent of the saltwater anglers surveyed fished in their home state in 2006, compared to 76 percent in 2001 (USFWS, 2001).

Specific information regarding angler expenditures for trips targeting HMS species was extracted from the recreational fishing expenditure survey add-on (1998 in the Northeast, 1999 – 2000 in the Southeast) to the MRFSS. These angler expenditure data were analyzed on a per person per trip-day level and reported in 2003 dollars. The expenditure data include the costs of tackle, food, lodging, bait, ice, boat fuel, processing, transportation, party/charter fees, access/boat launching, and equipment rental. The overall average expenditure on HMS related trips is estimated to be \$122 per person per day. Specifically, expenditures are estimated to be

\$85 per person per day on pelagic shark directed trips, \$95 on LCS directed trips, and \$81 on SCS.

The American Sportfishing Association (ASA) also has a report listing the 2006 economic impact of sportfishing on specific states. This report states that all sportfishing (in both federal and state waters) has an overall economic importance of \$125 billion dollars. ASA estimates 8,528,000 anglers participate in saltwater fishing. These saltwater anglers spent \$11 billion in retail sales, resulting in 263,000 jobs, and \$9 billion in salaries, wages, and business earnings in 2006. Saltwater fishing contributed \$30 billion of the overall economic impact estimated. Florida, Texas, South Carolina, and North Carolina are among the top ten states in terms of overall economic expenditures for both saltwater and freshwater fishing. Florida is also one of the top states in terms of economic impact of saltwater fishing with \$3.0 billion in angler expenditures, \$5.1 billion in overall economic impact, \$1.6 billion in salaries and wages related to fishing, and 51,588 fishing related jobs (ASA, 2008).

At the end of 2004, NMFS began collecting market information regarding advertised charterboat rates. This analysis of the data collected focused observations of advertised rates on the internet for full day charters. Full day charters vary from six to 14 hours long with a typical trip being 10 hours. Most vessels can accommodate six passengers, but this also varies from two to 12 passengers. Table 3.40 summarizes the average charterboat rate for full day trips on vessels with HMS Charter/Headboat permits. The average price for a full day boat charter was \$1,053 in 2004. Sutton *et al.*, (1999) surveyed charterboats throughout Alabama, Mississippi, Louisiana, and Texas in 1998 and found the average charterboat base fee to be \$762 for a full day trip. Holland *et al.* (1999) conducted a similar study on charterboats in Florida, Georgia, South Carolina, and North Carolina and found the average fee for full day trips to be \$554, \$562, \$661, and \$701, respectively. Comparing these two studies conducted in the late 1990s to the average advertised daily HMS charterboat rate in 2004, it is apparent that there has been a significant gain in charterboat rates.

**Table 3.40 Average Atlantic HMS charterboat rates for day trips.**

Source: NMFS searches for advertised daily charter rates of HMS Charter/Headboat permit holders. (Observations=99)

State	2004 Average Daily Charter Rate
AL	\$1,783
CT	\$1,500
DE	\$1,060
FL	\$894
LA	\$1,050
MA	\$777
MD	\$1,167
ME	\$900
NC	\$1,130
NJ	\$1,298

State	2004 Average Daily Charter Rate
NY	\$1,113
RI	\$917
SC	\$1,300
TX	\$767
VA	\$825
<b>Overall Average</b>	<b>\$1,053</b>

Generally, HMS tournaments last from three to seven days, but lengths can range from one day to an entire fishing season. Similarly, average entry fees can range from approximately \$0 to \$5,000 per boat (average approximately \$500 – \$1,000/boat), depending largely upon the magnitude of the prize money that is being awarded. The entry fee would pay for a maximum of two to six anglers per team during the course of the tournament. Additional anglers can, in some tournaments, join the team at a reduced rate of between \$50 and \$450. The team entry fee is not directly proportional to the number of anglers per team, but rather is proportional with the amount of money available for prizes and, possibly, the species being targeted. Prizes may include citations, T-shirts, trophies, fishing tackle, automobiles, boats, or other similar items, but most often consists of cash awards. In general, it appears that billfish and tuna tournaments charge higher entry fees and award more prize money than shark and swordfish tournaments, although all species have a wide range.

Several tournaments target sharks. Many shark tournaments occur in New England, New York, and New Jersey, although other regions hold shark tournaments as well. In 2008, the 28<sup>th</sup> Annual South Jersey Shark Tournament hosted 180 boats and awarded over \$336,005 in prize money, with an entry fee of \$525 per boat. The “Mako Fever” tournament, sponsored by the Jersey Coast Shark Anglers, in 2009 awarded over \$55,000 in prizes, with an entry fee of \$350 per boat per day. In 2009, the 23<sup>rd</sup> Annual Oak Bluffs Monster Shark Tournament in Martha’s Vineyard featured 130 participating boats which paid an entry fee of \$1,375 per boat.

In addition to official prize money, many fishing tournaments may also conduct a “calcutta” whereby anglers pay from \$200 to \$5,000 to win more money than the advertised tournament prizes for a particular fish. Tournament participants do not have to enter calcuttas. Tournaments with calcuttas generally offer different levels depending upon the amount of money an angler is willing to put down. Calcutta prize money is distributed based on the percentage of the total amount entered into that calcutta. Therefore, first place winner of a low level calcutta (entry fee ~\$200) could win less than a last place winner in a high level calcutta (entry fee ~\$1000). On the tournament websites, it was not always clear if the total amount of prizes distributed by the tournament included prize money from the calcuttas or the estimated price of any equipment. As such, the range of prizes discussed above could be a combination of fish prize money, calcutta prize money, and equipment/trophies.

Fishing tournaments can sometimes generate a substantial amount of money for surrounding communities and local businesses. Besides the entry fee to the tournament and possibly the calcutta, anglers may also pay for marina space and gas (if they have their own

vessel), vessel rental (if they do not have their own vessel), meals and awards dinners (if not covered by the entry fee), hotel, fishing equipment, travel costs to and from the tournament, camera equipment, and other miscellaneous expenses. Less direct, but equally important, fishing tournaments may serve to generally promote the local tourist industry in coastal communities. In a survey of participants in the 1999 Pirates Cove Billfish Tournament, Ditton, *et al.* (2000) found that almost 80 percent of tournament anglers were from outside of the tournament's county. For this reason, tourism bureaus, chambers of commerce, resorts, and state and local governments often sponsor fishing tournaments.

While fishing tournaments are an important component of Atlantic HMS recreational fisheries and provide socioeconomic benefits to associated communities, there are some organizations that oppose these tournaments. For the past several years, for example, the Humane Society of the United States has petitioned NMFS to halt all shark tournaments.

### **3.7 Community and Social Update**

Taken together, NEPA and the Magnuson-Stevens Act require NMFS to take a hard look at the potential for conservation and management actions that result in adverse social and economic impacts to fishery participants, fishermen and fishing communities; and, take efforts to identify and implement measures to minimize or mitigate such impacts. According to NS 8, conservation and management measures should, consistent with conservation requirements, “take into account the importance of fishery resources to fishing communities by utilizing economic and social data (based on the best available information) in order to (A) provide for the sustained participation of such communities, (B) to the extent practicable, minimize adverse economic impacts on such communities.” The Magnuson-Stevens Act requires, among other things, that all FMPs include a fishery impact statement intended to assess, specify, and describe the likely effects of the conservation and management measures on participants in the fishery, fishermen and fishing communities (§303(a)(9); §304(g)(1)(C). NEPA also requires federal agencies to consider the interactions of natural and human environments by using a “systematic, interdisciplinary approach which will ensure the integrated use of the natural and social sciences...in planning and decision-making” (§102(2)(A)). Moreover, agencies need to address the aesthetic, historic, cultural, economic, social, or health effects, which may be direct, indirect, or cumulative. Consideration of social impacts is a growing concern as fisheries experience increased participation and/or declines in stocks. The consequences of management actions need to be examined to better ascertain and, if necessary and possible, mitigate regulatory impacts on affected constituents.

The information presented here addresses new data concerning the social and economic well-being of participants in the fishery and supporting data for analyses necessary to comply with not only NEPA, but also the foregoing requirements of the Magnuson-Stevens Act including NS8 and the Final Fisheries Impact Statement. Chapter 9 of this document provides a summary of several fishing communities that may be impacted by the measures in this amendment as well as the Final Fisheries Impact Statement which provides a summary of impacts to participants in the shark fishery and fishing dependent communities.

### 3.7.1 Overview of Current Information and Rationale

Social impacts are generally the consequences to human populations resulting from some type of public or private action. Those consequences may include alterations to the ways in which people live, work or play, relate to one another, and organize to meet their needs. In addition, cultural impacts, which may involve changes in values and beliefs that affect people's way of identifying themselves within their occupation, communities, and society in general are included under this interpretation. Social impact analyses help determine the consequences of policy action in advance by comparing the status quo with the projected impacts. Community profiles are an initial step in the social impact assessment process. Although public hearings and scoping meetings provide input from those concerned with a particular action, they do not constitute a full overview of the fishery.

The Magnuson-Stevens Act outlines a set of NSs that apply to all fishery management plans and the implementation of regulations. Specifically, NS 8 notes that:

“Conservation and management measures, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities by utilizing economic and social data that meet the requirements of paragraph (2), in order to: (A) provide for the sustained participation of such communities; and, (B) to the extent practicable, minimize adverse economic impacts on such communities.” (§301(a)(8)). See also 50 CFR §600.345 for NS 8 Guidelines.

“Sustained participation” is defined to mean continued access to the fishery within the constraints of the condition of the resource (50 CFR §600.345(b)(4)). It should be clearly noted that NS 8 “does not constitute a basis for allocation of resources to a specific fishing community nor for providing preferential treatment based on residence in a fishing community” (50 CFR §600.345(b)(2)). The Magnuson-Stevens Act further defines a “fishing community” as:

“...a community that is substantially dependent upon or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, crew, and fish processors that are based in such communities.” (§3(16))

NMFS (2001) guidelines for social impact assessments specify that the following elements are utilized in the development of FMPs and FMP amendments:

1. The size and demographic characteristics of the fishery-related work force residing in the area; these determine demographic, income, and employment effects in relation to the work force as a whole, by community and region.
2. The cultural issues of attitudes, beliefs, and values of fishermen, fishery-related workers, other stakeholders, and their communities.
3. The effects of proposed actions on social structure and organization; that is, on the ability to provide necessary social support and services to families and communities.

4. The non-economic social aspects of the proposed action or policy; these include life-style issues, health and safety issues, and the non-consumptive and recreational use of living marine resources and their habitats.
5. The historical dependence on and participation in the fishery by fishermen and communities, reflected in the structure of fishing practices, income distribution and rights.

### **3.7.2 Methodology**

#### *Previous community profiles and assessments*

NMFS contracted with Dr. Doug Wilson, from the Ecopolicy Center for Agriculture, Environmental and Resource Issues at Rutgers, the State University of New Jersey, to help develop the community profiles and social impact assessments for the 1999 HMS FMP and Amendment 1 to the FMP for Atlantic Billfish. Dr. Wilson and his colleagues completed their fieldwork in July 1998. This study covered commercial and recreational Atlantic HMS fisheries extending along the Atlantic and Gulf coasts from Maine to Texas and in the Caribbean. The study investigated the social and cultural characteristics of fishing communities in five states and one U.S. territory: Massachusetts, New Jersey, North Carolina, Florida, Louisiana, and Puerto Rico. These areas were selected because they each had important fishing communities that could be affected by the 1999 FMP for Atlantic Tunas, Swordfish, and Sharks and the 1999 Atlantic Billfish FMP Amendment 1, and because they are fairly evenly spread along the Atlantic and Gulf coasts and the Caribbean. The study compiled basic sociological information from at least two coastal communities from each state or territory. For each state or territory, a profile of basic sociologic information was compiled, with at least two coastal communities visited for further analysis. Towns were selected based on HMS landings data, the relationship between the geographic communities and the fishing fleets, the existence of other community studies, and inputs from the Advisory Panels for HMS and Billfish. The information in this document incorporates by reference the Wilson *et al.*, (1998) study of the HMS fishery and the work of McCay and Cieri (2000) for the Mid-Atlantic Fishery Management Council, “The Fishing Ports of the Mid-Atlantic” ([http://www.st.nmfs.noaa.gov/st1/econ/cia/McCay\\_Port\\_Study-Apr2000\\_Revised.pdf](http://www.st.nmfs.noaa.gov/st1/econ/cia/McCay_Port_Study-Apr2000_Revised.pdf))

Additionally, NMFS contracted with the Virginia Institute of Marine Science (VIMS) at the College of William and Mary to re-evaluate several of the baseline HMS communities (Kirkley, 2005). The VIMS study gathered a profile of basic sociological information for the principal states involved with the Atlantic shark fishery. From the 255 communities identified as involved in the 2001 commercial fishery, Amendment 1 to the 1999 HMS FMP focused on specific towns based on shark landings data, the size of the shark fishing fleet, the relationship between the geographic communities and the fishing fleets, and the existence of other community studies. While the recreational fishery is an important component in the overall shark fishery, the VIMS study did not profile the shark recreational fishery because participation and landings were not documented in a manner that permits community identification. The Wilson *et al.*, study selected for profile, only the recreational fisheries found within commercial

fishing communities due to the lack of community-based data for the sport fishery. To the extent that it is available, the information on the HMS-related recreational fisheries has been incorporated into the community profiles.

Following the Consolidated HMS FMP, which published in 2006, NMFS contracted MRAG Americas, Inc. to create a report updating current HMS fishery community profiles. The report utilized HMS permit information and U.S. census data to rank communities according to the percentage of HMS permits, by permit category, and in relation to their overall population; based on a methodology described by Sepez *et al.* (2005). Communities that met the mean percentage for at least one permit category were included and community profile information was created or updated accordingly. The report identified 14 communities that have not previously been included (Wakefield, Rhode Island; Montauk, New York; Cape May, New Jersey; Ocean City, Maryland; Atlantic Beach, Beaufort, and Morehead City, North Carolina; Apalachicola, Destin, and Port Salerno, Florida; Orange Beach, Alabama; Grand Isle, Louisiana; and Freeport and Port Aransas, Texas), along with 10 communities that had been included in previous SAFE reports (Gloucester and New Bedford, Massachusetts; Barnegat Light and Brielle, New Jersey; Hatteras Village and Wanchese, North Carolina; Islamorada and Madeira Beach, Florida; and Dulac and Venice, Louisiana). This list did not include four communities that had been included in assessments since the 1999 HMS FMP (Fort Pierce, Panama City Beach, and Pompano Beach, Florida; and Arecibo, Puerto Rico). All communities that have been identified by MRAG Americas, Inc. and ones that have been evaluated in the past are included in this assessment to update the most recent community profile information available and to ensure continuity with the 1999 HMS FMP and previous amendments.

The list of communities profiled in the reports noted above is not intended to be an exhaustive record of every HMS-related community in the United States; rather the objective is to give a broad perspective of representative areas. The demographic profile tables found in the 2008 SAFE Report (NMFS, 2008) were modified from previous documents to include the same baseline information for each community profiled, and use both 1990 and 2000 Bureau of the Census data for comparative purposes. A profile for the U.S. Virgin Islands could not be created because the 1990 Census data were not available, and only some of the demographic information was available for 2000. Additionally, a descriptive profile for the Virgin Islands has not been developed for any previous HMS-related actions. The descriptive community profiles in this chapter include information provided by Wilson, *et al.* (1998) and Kirkley (2005), Impact Assessment, Inc. (2004), and recent information obtained from MRAG Americas, Inc. (2008). In this chapter, the community descriptions are organized by state.

### *Community Impacts from Hurricanes*

This section is an overview of the impacts on HMS communities caused by hurricanes during 2008. Please refer to prior SAFE reports for hurricane impact information prior to 2008.

The 2008 hurricane season, which was above average for most tropical cyclone parameters (Klotzbach and Gray, 2008), generated storms that caused significant impacts to Gulf Coast Communities. Hurricane Gustav made landfall in Louisiana as a Category 2 storm, damaging areas in Louisiana, Alabama, Mississippi and Arkansas with high winds, storm surge, and flooding. Damage costs to these areas are estimated to be at least \$5 billion (Lott *et. al.*

2008). Hurricane Ike followed shortly after Hurricane Gustav, but made landfall over Galveston, Texas as a large Category 2 storm (FEMA, 2008). Ike caused significant damage to coastal areas in Texas, along with areas in Louisiana, Arkansas, Illinois, Pennsylvania, Kentucky, Indiana, Missouri, and Ohio estimated at over \$27 billion (Lott et. al, 2008). The Texas Parks and Wildlife Department estimated the economic impact to the commercial and recreational fisheries in Texas at \$650 million, although losses are difficult to estimate because they largely depend on how quickly infrastructure (e.g., boat ramps, processing facilities) can be restored to the area (FEMA, 2008). Damage to offshore oil platforms from Hurricane Ike also led to gasoline shortages in the southeastern United States (Lott et. al, 2008). Combined damage to the Louisiana fishing industry from Hurricanes Gustav and Ike was estimated at \$300,000,000 (Times-Picayune, 2008). These impacts, along with high fuel costs and a slowing economy, may have detrimentally affected HMS fishery operations in this region.

### **3.7.3 Summary of Social Data and Information**

For information regarding HMS fishing activities for individual states and communities, please refer to the 2008 SAFE Report for Atlantic Highly Migratory Species (NMFS, 2008). The 2008 SAFE Report contains the most recent information available to NMFS detailing U.S. Census information regarding communities participating in HMS fisheries. The MRAG Americas Report “Updated Profiles for HMS Dependent Fisheries,” can be found in Appendix E of Amendment 2 to the 2006 Consolidated HMS FMP.

## **3.8 International Trade and Fish Processing**

Several regional fishery management organizations (RFMOs), including ICCAT, have taken steps to improve the collection of international trade data to further international conservation policy for the management of HMS. While RFMOs cannot re-create information about stock production based on trade data, this information can be used provisionally to estimate landings related to these fisheries, and to identify potential compliance problems with certain RFMO management measures. United States participation in HMS related international trade programs, as well as a review of trade activity, is discussed in this section.

### **3.8.1 Overview of International Trade for Atlantic HMS**

#### **3.8.1.1 Trade Monitoring**

The United States collects general trade monitoring data through the U.S. Bureau of Customs and Border Protection (CBP; imports) and the U.S. Bureau of the Census (Census Bureau; exports and imports). These programs collect data on the amount and value of imports and exports categorized under the Harmonized Tariff Schedule (HTS). Many HMS have distinct HTS codes, and some species are further subdivided by product (e.g., fresh or frozen, fillets, steaks, etc.). NMFS provides Census Bureau trade data for all marine fish products online for the public at <http://www.st.nmfs.gov/st1/trade/index.html>. Shark species are grouped together, which can limit the value of these data for fisheries management when species-specific information is needed. These data are further limited since the ocean area of origin for each product is not distinguished.

Trade data for Atlantic HMS, including shark species, are of more use as a conservation tool when they indicate the flag of the harvesting vessel, the ocean of origin, and the species for each transaction. Under the authority of ATCA and the Magnuson-Stevens Act, NMFS collects this information while monitoring international trade of bluefin tuna, swordfish, southern bluefin tuna, and frozen bigeye tuna. These programs implement ICCAT recommendations and support rebuilding efforts by collecting data necessary to identify nations and individuals that may be fishing in a manner that diminishes the effectiveness of ICCAT fishery conservation and management measures. Copies of all trade monitoring documents associated with these programs may be found on the NMFS HMS Management Division webpage at <http://www.nmfs.noaa.gov/sfa/hms/>. These and several other trade monitoring programs established by NMFS for HMS, including sharks, are described in further detail below.

### **3.8.2 U.S. Exports of HMS**

“Exports” may include merchandise of both domestic and foreign origin. The Census Bureau defines exports of "domestic" merchandise to include commodities which are grown, produced, or manufactured in the United States (*e.g.*, fish caught by U.S. fishermen). For statistical purposes, domestic exports also include commodities of foreign origin which have been altered in the United States from the form in which they were imported, or which have been enhanced in value by further manufacture in the United States. The value of an export is the f.a.s. (free alongside ship) value defined as the value at the port of export based on a transaction price including inland freight, insurance, and other charges incurred in placing the merchandise alongside the carrier. It excludes the cost of loading the merchandise, freight, insurance, and other charges or transportation costs beyond the port of exportation.

#### **3.8.2.1 Shark Exports**

Export data for sharks is gathered by the Census Bureau, and includes trade data for sharks from any ocean area of origin. Shark exports are not categorized down to the species level with the exception of dogfish, and are not identified by specific product code other than fresh or frozen meat and fins. Due to the popular trade in shark fins and their high relative value compared to shark meat, a specific HTS code was assigned to shark fins in 1998. It should be noted that there is no tracking of other shark products besides meat and fins. Therefore, NMFS cannot track trade in shark leather, oil, or shark cartilage products.

Table 3.41 indicates the magnitude and value of shark exports by the United States from 1999 – 2008. The reduction in shark fin exports from 2002 to 2008 is of particular note, as is the increase in the unit value of shark fins during this time period. Decreases in shark fin trade were expected as the result of the Shark Finning Prohibition Act, which was enacted in December of 2000 and implemented by final rule (67 FR 6194, February 11, 2002). Also of note is the dramatic increase in export of frozen shark products in 2008.

**Table 3.41 Amount and Value of U.S. Shark Product Exports From 1999-2008.**  
Source: Census Bureau.

Yr	Shark Fins Dried			Non-specified Fresh Shark			Non-specified Frozen Shark			Total for all Exports	
	MT	US\$ (million)	\$/K G	MT	US\$ (million)	\$/KG	MT	US\$ (million)	\$/K G	MT	US\$ (million)
1999	106	.91	8.54	270	.48	1.80	155	.46	2.97	532	1.86
2000	365	3.51	9.62	430	.78	1.82	345	.81	2.35	1140	5.10
2001	335	3.16	9.44	332	.54	1.64	634	2.34	3.69	1301	6.04
2002	123	3.46	28.00	968	1.47	1.52	982	2.34	2.38	2075	7.28
2003	45	4.03	87.79	837	1.31	1.57	592	1.34	2.28	1476	6.70
2004	63	3.02	47.53	536	1.18	2.21	472	.98	2.09	1071	5.18
2005	31	2.37	76.93	377	1.03	2.73	494	1.06	2.15	902	4.46
2006	34	3.17	94.66	816	1.62	1.99	747	1.38	1.85	1597	6.17
2007	19	1.78	93.68	502	1.05	2.09	695	1.35	1.94	1216	4.18
2008	10	0.69	69.00	559	1.21	2.16	4121	7.21	1.74	4,690	3.64

Note: Exports may be in whole (ww) or product weight (dw); data are preliminary and subject to change.

### 3.8.3 U.S. Imports of Atlantic HMS

All import shipments must be reported to the U.S. Bureau of Customs and Border Protection. "General" imports are reported when a commodity enters the country, and "consumption" imports consist of entries into the United States for immediate consumption combined with withdrawals from CBP bonded warehouses. "Consumption" import data reflect the actual entry of commodities originating outside the United States into U.S. channels of consumption. As discussed previously, CBP data for certain products are provided to NMFS for use in implementing statistical document programs. U.S. Census Bureau import data are used by NMFS as well.

#### 3.8.3.1 Shark Imports

For shark imports, NMFS does not require importers to collect and submit information regarding the ocean area of catch. Shark imports are also not categorized by species, and lack specific product information on imported shark meat such as the proportion of fillets, steaks, or loins. The condition of shark fin imports; *e.g.*, wet, dried, or further processed products such as canned shark fin soup, is also not collected. There is no longer a separate tariff code for shark leather, so its trade is not tracked by CBP or Census Bureau data.

The United States may be an important transshipment port for shark fins, which may be imported wet, processed, and then exported dried. It is also probable that U.S.-caught shark fins are exported to Hong Kong or Singapore for processing, and then imported back into the United States for consumption by urban-dwelling Asian Americans (Rose, 1996).

Table 3.42 summarizes Census Bureau data on shark imports for 1999 through 2008. Imports of fresh shark products and shark fins have decreased significantly since 1999. As of July 2, 2008, shark importers, exporters, and re-exporters are required to be permitted under NMFS' HMS International Trade Permit regulations (73 FR 31380). Permitting of shark fin

traders was implemented to assist in enforcement and monitoring trade of this valuable commodity.

From 1999 to 2008, the overall annual amount and value of shark imports has fluctuated. Imports of dried shark fins has been increasing gradually since 2003.

**Table 3.42 U.S. Imports of Shark Products From All Ocean Areas Combined: 1999-2008.**

Source: Census Bureau data.

Year	Shark Fins Dried		Non-specified Fresh Shark		Non-specified Frozen Shark		Total For All Imports	
	MT	US\$ (million)	MT	US\$ (million)	MT	US\$ (million)	MT	US\$ (million)
1999	59	2.10	1,095	2.03	105	.62	1,260	4.76
2000	66	2.35	1,066	1.85	90	.57	1,222	4.79
2001	50	1.08	913	1.38	123	1.78	1,087	4.25
2002	39	1.02	797	1.24	91	1.09	928	3.35
2003	11	0.01	515	0.72	100	0.99	626	1.82
2004	14	0.34	650	1.00	156	2.35	821	3.70
2005	27	0.75	537	1.02	147	2.27	711	4.04
2006	28	1.38	338	0.68	93	1.35	459	3.41
2007	29	1.68	548	1.03	174	1.04	751	3.75
2008	29	1.74	348	0.72	189	1.88	566	4.34

NOTE: Imports may be whole weight (ww) or product weight (dw); data are preliminary and subject to change.

### 3.9 Bycatch, Incidental Catch, and Protected Species

Bycatch in commercial and recreational fisheries has become an important issue for the fishing industry, resource managers, scientists, and the public. Bycatch can result in death or injury to the discarded fish, and it is essential that this component of total fishing-related mortality be incorporated into fish stock assessments and evaluation of management measures. Bycatch precludes other more productive uses of fishery resources and decreases the efficiency of fishing operations. Although not all discarded fish die, bycatch can become a large source of mortality, which can slow the rebuilding of overfished stocks. Bycatch imposes direct and indirect costs on fishing operations by increasing sorting time and decreasing the amount of gear available to catch target species. Incidental catch concerns also apply to populations of marine mammals, sea turtles, seabirds, and other components of ecosystems which may be protected under other applicable laws and for which there are no commercial or recreational uses but for which existence values may be high.

In 1998, NMFS developed a national bycatch plan, *Managing the Nation's Bycatch* (NMFS, 1998b), which includes programs, activities, and recommendations for federally managed fisheries. The national goal of the Agency's bycatch plan activities is to implement conservation and management measures for living marine resources that will minimize, to the extent practicable, bycatch and the mortality of bycatch that cannot be avoided. Inherent in this

goal is the need to avoid bycatch, rather than create new ways to utilize bycatch. The plan also established a definition of bycatch as fishery discards, retained incidental catch, and unobserved mortalities resulting from a direct encounter with fishing gear.

### **3.9.1 Bycatch Reduction and the Magnuson-Stevens Act**

The Magnuson-Stevens Act defines bycatch as fish that are harvested in a fishery, but are not sold or kept for personal use, and includes economic and regulatory discards. Such term does not include fish released alive under a recreational catch and release fishery management program. Fish is defined as finfish, mollusks, crustaceans, and all other forms of marine animal and plant life other than marine mammals and birds. Birds and marine mammals are therefore not considered bycatch under the MSA but are examined as incidental catch. Bycatch does not include fish released alive under a recreational catch-and-release fishery management program.

NS 9 of the Magnuson-Stevens Act requires that fishery conservation and management measures shall, to the extent practicable, minimize bycatch and minimize the mortality of bycatch that cannot be avoided. In many fisheries, it is not practicable to eliminate all bycatch and bycatch mortality. Some relevant examples of fish caught in Atlantic HMS fisheries that are included as bycatch or incidental catch are marlin, undersized swordfish, and bluefin tuna caught and released by commercial fishing gear; undersized swordfish and tunas in recreational hook and line fisheries; species for which there is little or no market such as blue sharks; and species caught and released in excess of a bag limit.

There are benefits associated with the reduction of bycatch, including the reduction of uncertainty concerning total fishing-related mortality, which improves the ability to assess the status of stocks, to determine the appropriate relevant controls, and to ensure that overfishing levels are not exceeded. It is also important to consider the bycatch of HMS in fisheries that target other species as a source of mortality for HMS and to work with fishery constituents and resource manager partners on an effective bycatch strategy to maintain sustainable fisheries. This strategy may include a combination of management measures in the domestic fishery, and if appropriate, multi-lateral measures recommended by international bodies such as ICCAT or coordination with Regional Fishery Management Councils or States. The bycatch in each fishery is summarized annually in the SAFE report for Atlantic HMS fisheries. The effectiveness of the bycatch reduction measures is evaluated based on this summary.

A number of options are currently employed (\*) or available for bycatch reduction in Atlantic HMS fisheries. These include but are not limited to:

#### Commercial

1. \*Gear Modifications (including hook and bait types)
2. \*Circle Hooks
3. \*Time/Area Closures
4. Performance Standards
5. \*Education/Outreach

6. \*Effort Reductions (*i.e.*, Limited Access)
7. Full Retention of Catch
8. \*Use of De-hooking Devices (mortality reduction only)

#### Recreational

1. \*Use of Circle Hooks (mortality reduction only)
2. Use of De-hooking Devices (mortality reduction only)
3. Full Retention of Catch
4. \*Formal Voluntary or Mandatory Catch-and-Release Program for all Fish or Certain Species
5. \*Time/Area Closures

There are probably no fisheries in which there is zero bycatch because none of the currently legal fishing gears are perfectly selective for the target of each fishing operation (with the possible exception of the swordfish/tuna harpoon fishery and speargun fishery). Therefore, to totally eliminate bycatch of all non-target species in Atlantic HMS fisheries would be impractical. The goal then is to minimize the amount of bycatch to the extent practicable and minimize the mortality of species caught as bycatch.

### **3.9.2 Standardized Reporting of Bycatch**

Section 303(a)(11) of the Magnuson-Stevens Act requires that a FMP establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery. In 2004, NMFS published a report entitled “*Evaluating Bycatch: A National Approach to Standardized Bycatch Monitoring Programs*,” which described the current status of and guidelines for bycatch monitoring programs (NMFS, 2004d). The data collection and analyses that are used to estimate bycatch in a fishery constitute the “standardized bycatch reporting methodology” (SBRM) for that fishery (NMFS, 2004d). Appendix 5 of the report specifies the protocols for SBRMs established by NMFS throughout the country.

As part of the Agency’s National Bycatch Strategy, NMFS established a National Working Group on Bycatch (NWGB) to develop a national approach to standardized bycatch reporting methodologies and monitoring programs. This work is to be the basis for regional teams, established in the National Bycatch Strategy, to make fishery-specific recommendations.

The NWGB reviewed regional issues related to fisheries and bycatch and discussed advantages and disadvantages of various methods for estimating bycatch including: (1) fishery-independent surveys; (2) self-reporting through logbooks, trip reports, dealer reports, port sampling, and recreational surveys; (3) at-sea observation, including observers, digital video cameras, digital observers, and alternative platform and remote monitoring; and (4) stranding networks. All of the methods may contribute to useful bycatch estimation programs, but at-sea observation (observers or electronic monitoring) provides the best mechanism to obtain reliable and accurate bycatch estimates for many fisheries. Often, observer programs also will be the

most cost-effective of these alternatives. However, observers are not always the most cost-effective or practicable method for assessing bycatch (NMFS, 2004d).

The effectiveness of any SBRM depends on its ability to generate estimates of the type and quantity of bycatch that are both precise and accurate enough to meet the conservation and management needs of a fishery. The National Bycatch Report (NMFS, 2004d) contains an in-depth examination of the issues of precision and accuracy in estimating bycatch. Accuracy refers to the closeness between the estimated value and the (unknown) true value that the statistic was intended to measure. Precision refers to how closely multiple measurements of the same statistic are to one another when obtained under the same protocol. The precision of an estimate depends on how consistent independent measurements are to one another; the tighter the cluster, or the greater the consistency in independent measurements, the more precise the estimate. The precision of an estimate is often expressed in terms of the coefficient of variation (CV) defined as the standard error of the estimator divided by the estimate. The lower the CV, the more precise the estimate is considered to be. A precise estimate is not necessarily an accurate estimate. The National Bycatch Report (NMFS, 2004d) contains an extensive discussion of how precision relates to sampling and to assessments.

The other important aspect of obtaining bycatch estimates that are useful for management purposes is accuracy. Accuracy is the difference in the mean of the sample and the true value of that property in the sampled universe (NMFS, 2004d). In other words, accuracy refers to how correct the estimate is. Efficient allocation of sampling effort within a stratified survey design improves the precision of the estimate of overall discard rates (Rago *et al.*, 2005). Accuracy of sample estimates can be evaluated by comparing performance measures (*e.g.*, landings, trip duration) between vessels with and without observers present. While there are differences between the terms accuracy and bias they have been used interchangeably. A “biased” estimate is inaccurate while an “accurate” estimate is unbiased (Rago *et al.*, 2005).

The NWGB recommended that at-sea sampling designs should be formulated to achieve precision goals for the least amount of observation effort, while also striving to increase accuracy (NMFS, 2004d). This can be accomplished through random sample selection, developing appropriate sampling strata and sampling allocation procedures, and by implementing appropriate tests for bias. Sampling programs will be driven by the precision and accuracy required by managers to address management needs for estimating management quantities such as allowable catches through a stock assessment, for evaluating bycatch relative to a management standard such as allowable take, and for developing mitigation mechanisms.

The recommended precision goals for estimates of bycatch are defined in terms of the CV of each estimate. For marine mammals and other protected species, including seabirds and sea turtles, the recommended precision goal is a 20 to 30 percent CV for estimates of interactions for each species/stock taken by a fishery. For fishery resources, excluding protected species, caught as bycatch in a fishery, the recommended precision goal is a 20 to 30 percent CV for estimates of total discards (aggregated over all species) for the fishery; or if total catch cannot be divided into discards and retained catch, then the goal is a 20 to 30 percent CV for estimates of total catch (NMFS, 2004d). The report also states that attainment of these goals may not be possible or practical in all fisheries and should be evaluated on a case-by-case basis.

The CV of an estimate can be reduced and the precision increased by increasing sample size. In the case of observer programs, this would entail increasing the number of trips or gear deployments observed. Increasing the number of trips observed increases both the cost in terms of funding, but also the logistical complexities and safety concerns. However, the improvements in precision will decline at a decreasing rate as sample size is increased to a point where it will not be cost-effective to increase sample size any further. This concept is illustrated in Figure 1 of the National Bycatch Report (NMFS, 2004d). As a result of this statistical relationship, fishery managers select observer coverage levels that should achieve the desired or required balance between precision of bycatch estimates and cost.

While the relationship between precision and sample size is relatively well known (NMFS, 2004d), the relationship between sample size and accuracy is not reliable. Observer programs strive to achieve samples that are representative of both fishing effort and catches. Representativeness of the sample is critical not only for obtaining accurate (*i.e.*, unbiased) estimates of bycatch, but also for collecting information about factors that may be important for mitigating bycatch. Bias may be introduced at several levels: when vessels are selected for coverage, when hauls are selected for sampling, or when only a portion of the haul can be sampled (NMFS, 2004d).

Rago *et al.* (2005) examined potential sources of bias in commercial fisheries of the Northeast Atlantic by comparing measures of performance for vessels with and without observers. Bias can arise if the vessels with observers onboard consistently catch more or less than other vessels, if trip durations change, or if vessels fish in different areas. Average catches (pounds landed) for observed and total trips compared favorably and the expected differences of the stratum specific means and standard deviations for both kept weight and trip duration was near zero (Rago *et al.*, 2005). Although mean trip duration was slightly longer on observed trips, the difference was not significantly different from zero. The spatial distribution of trips matched well based on a comparison of VMS data with observed trips (Murawski, 2005). The authors concluded that the level of precision in discard ratios as a whole was high and that there was little evidence of bias. The results of this study indicate that bias may not be as large an issue in self-reported data as has been suggested by Babcock *et al.* (2003), but additional analyses would need to be conducted to determine the applicability to HMS fisheries.

A simplistic approach in trying to get more accurate bycatch estimates is to increase observer coverage. A report by Babcock *et al.* (2003) suggests that relatively high percentages of observer coverage are necessary to adequately address potential bias in bycatch estimates from observer programs. However, the examples cited by Babcock *et al.* (2003) as successful in reducing bias through high observer coverage levels are fisheries comprised of relatively few vessels compared to many other fisheries, including the Atlantic HMS fisheries. Their examples are not representative of the issues facing most observer programs and fishery managers, who must work with limited resources to cover large and diverse fisheries. It is also incorrect to assume that simply increasing observer coverage ensures accuracy of the estimates (Rago *et al.*, 2005). Bias due to unrepresentative sampling may not be reduced by increasing sample size due to logistical constraints, such as if certain classes of vessels cannot accommodate observers. Increasing sample size may only result in a larger, but still biased, sample.

Although the precision goals for estimating bycatch are important factors in determining observer coverage levels, other factors are also considered when determining actual coverage levels. These may result in lower or higher levels of coverage than that required to achieve the precision goals for bycatch estimates. In general, factors that may justify lower coverage levels include lack of adequate funding; incremental coverage costs that are disproportionately high compared to benefits; and logistical consideration such as lack of adequate accommodations on a vessel, unsafe conditions, and lack of cooperation by fishermen (NMFS, 2004d).

Factors that may justify higher coverage levels include incremental coverage benefits that are disproportionately high compared to costs and other management focused objectives for observer programs. The latter include total catch monitoring, in-season management of total catch or bycatch, monitoring bycatch by species, monitoring compliance with fishing regulations, monitoring requirements associated with the granting of Experimental Fishery Permits, or monitoring the effectiveness of gear modifications or fishing strategies to reduce bycatch. In some cases, management may require one or even two observers to be deployed on every fishing trip. Increased levels of coverage may also be desirable to minimize bias associated with monitoring “rare” events with particularly significant consequences (such as takes of protected species), or to encourage the introduction of new “standard operating procedures” for the industry that decrease bycatch or increase the ease with which bias can be monitored (NMFS, 2004d).

NMFS utilizes self-reported logbook data (Fisheries Logbook System or FLS, and the supplemental discard report form in the reef fish/snapper-grouper/king and Spanish mackerel/shark logbook program), at-sea observer data, and survey data (recreational fishery dockside intercept and telephone surveys) to produce bycatch estimates in HMS fisheries. The number and location of discarded fish are recorded, as is the disposition of the fish (*i.e.*, released alive vs. released dead). Post-release mortality of HMS can be accounted for in stock assessments to the extent that the data allow.

The fishery logbook systems in place are mandatory programs, and it is expected that the reporting rates are generally high (Garrison, 2005). Due to the management focus on HMS fisheries, there has been close monitoring of reporting rates, and observed trips can be directly linked to reported effort. In general, the gear characteristics and amount of observed effort is consistent with reported effort. However, under-reporting is possible, which can lead to a negative bias in bycatch estimates. Cramer (2000) compared dead discards of undersized swordfish, sailfish, white and blue marlin, and pelagic sharks from HMS logbook and POP data in the U.S. Atlantic PLL fishery. Cramer (2000) provided the ratio of catch estimated from the POP data divided by the reported catch in the HMS logbooks. The ratio indicated the amount of underreporting for each species in a given area. However, the data analyzed by Cramer (2000), was based on J-hook data from 1997 – 1999 and that gear is now illegal. In some instances, logbooks are used to provide effort information against which bycatch rates obtained from observers are multiplied to estimate bycatch. In other sectors/fisheries, self-reporting provides the primary method of reporting bycatch because of limited funding, priorities, *etc.*

The following section provides a review of the bycatch reporting methodologies for all HMS fisheries currently in place. Future adjustments may be implemented based on evaluation of the results of studies developed as part of the HMS Bycatch Reduction Implementation Plan, or as needed due to changing conditions in the fisheries. Further analyses of bycatch in the various HMS fisheries may be conducted as time, resources and priorities allow.

### **3.9.2.1 U.S. Atlantic Pelagic Longline Fishery**

NMFS utilizes both self-reported data (mandatory logbooks for all vessels) and observer data to monitor bycatch and incidental catch of protected species in the PLL fishery. The observer program has been in place since 1992 to document finfish bycatch, characterize fishery behavior, and quantify interactions with protected species (Beerkircher *et al.*, 2002). The program is mandatory for those vessels selected, and all vessels with directed and indirect swordfish permits are selected. The program had a target coverage level of five percent of the U.S. fleet within the North Atlantic (waters north of 5° N. latitude), as was agreed to by the United States at ICCAT. Actual coverage levels achieved from 1992 – 2003 ranged from two to nine percent depending on quarter and year. Observer coverage was 100 percent for vessels participating in the NED experimental fishery during 2001 – 2003. Overall observer coverage in 2003 was 11.5 percent of the total sets made, including the NED experiment. The program began requiring an eight percent coverage rate due to the requirements of the 2004 BiOp for Atlantic PLL Fishery for HMS (NMFS, 2004f). Observer coverage in 2005-08 ranged from 7.5 – 13.6 percent. Since 1992, data collection priorities have been to collect catch and effort data of the U.S. Atlantic pelagic longline fleet on highly migratory fish species, although information is also collected on bycatch of protected species. Due to increased observer coverage in the Mid-Atlantic Bight as mandated by the Pelagic longline Take reduction Team (PLTRT) final rule, percent observer coverage in this fishery is expected to increase.

Fishery observer effort is allocated among eleven large geographic areas and calendar quarter based upon the historical fishing range of the fleet (Walsh and Garrison, 2006). The target annual coverage is eight percent of the total reported sets, and observer coverage is randomly allocated based upon reported fishing effort during the previous fishing year/quarter/statistical reporting area (Beerkircher *et al.*, 2002). Bycatch rates of protected species (catch per 1,000 hooks) are quantified based upon observer data by year, fishing area, and quarter (Garrison, 2005). The estimated bycatch rate is then multiplied by the fishing effort (number of hooks) in each area and quarter reported to the FLS program to obtain estimates of total interactions for each species of marine mammal and sea turtle (Garrison, 2005).

### **3.9.2.2 Shark Bottom Longline Fishery**

Vessels participating in the BLL fishery for sharks are required to submit Gulf of Mexico reef fish, South Atlantic snapper-grouper, king and Spanish mackerel, and shark fisheries logbooks to report their catch and effort, including bycatch species and incidental catch of protected species. All vessels having shark LAPs are required to report. The CSFOP has monitored the shark BLL fishery since 1994. Since 2005, the program has been administered through the SEFSC out of the Panama City, Florida Laboratory. The program has been mandatory for vessels selected to carry observers beginning in 2002. Prior to that, it was a voluntary program relying on cooperating vessels/captains to take observers. From 2002 – 2005,

the objective of the vessel selection was to achieve a representative five percent level of coverage of the total fishing effort in each fishing area (North Atlantic, South Atlantic, and Gulf of Mexico) and during each fishing season of that year (Smith *et al.*, 2006). In 2006, target coverage level has been 3.9 percent of the total fishing effort. In 2007 and 2008, target coverage level of 4-6 percent of the total fishing effort. This level was estimated to attain a sample size needed to provide estimates of sea turtle, smalltooth sawfish, or marine mammal interactions with an expected CV of 0.3 (Carlson, unpubl., as cited in Smith *et al.*, 2006; Hale *et al.*, 2008).

Effective August 1, 2001, selected federal permit holders that report in the Coastal Fisheries logbook (Gulf of Mexico reef fish, South Atlantic snapper-grouper, king and Spanish mackerel, and shark fisheries) must report all species and quantities of discarded (alive and dead) sea turtles, marine mammals, birds, and finfish on a supplemental discard form. A randomly selected sample of 20 percent of the vessels with active permits in the above fisheries is selected each year. The selection process is stratified across geographic area (Gulf of Mexico and South Atlantic), gear (handline, longline, troll, gillnet, and trap), and number of fishing trips (ten or less trips and more than 11 trips). Of the 3,498 vessels with federal permits in these fisheries in 2006, a total of 512 vessels were selected to report. Of the 3,491 vessels with federal permits in these fisheries in 2007, 449 were selected to report. Shark fishermen can use the PLL logbook or the northeast vessel trip reports (VTR) depending on the permits held by the vessel. If they use either the PLL logbook or VTR, they need to report all of the catch and effort, as well as all the bycatch or incidental catch.

The final rule for Amendment 2 to the Consolidated Highly Migratory Species (HMS) Fishery Management Plan (FMP) (73 FR 35778, June 24, 2008, corrected at 73 FR 40658, July 15, 2008) established, among other things, a shark research fishery to maintain time series data for stock assessments and to meet NMFS' research objectives. The shark research fishery permits authorize participation in the shark research fishery and the collection of sandbar and non-sandbar LCS from federal waters in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea for the purposes of scientific data collection subject to 100 percent observer coverage. The commercial vessels selected to participate in the shark research fishery are the only vessels authorized to land/harvest sandbars subject to the sandbar quota available for each year. The base quota is 87.9 mt dw/year through December 31, 2012, although this number may be reduced in the event of overharvests, if any, and 116.6 mt dw/year starting on January 1, 2013. The selected vessels would also have access to the non-sandbar LCS, SCS, and pelagic shark quotas. Commercial vessels not participating in the shark research fishery may only land non-sandbar LCS, SCS, and pelagic sharks subject to the retention limits and quotas per 50 CFR 635.24 and 635.27, respectively.

### **3.9.2.3 Shark Gillnet Fishery**

Vessels participating in the gillnet fishery for sharks are required to submit logbooks to report their catch and effort, including bycatch species and incidental catch of protected species. An observer program for the directed shark gillnet fishery has been in place from 1993 – 1995 and from 1998 to the present. The objectives of this program are to obtain estimates of catch and bycatch and incidental catch and associated mortality rates of protected species, juvenile sharks, and other fish species. Catch and bycatch estimates are produced to meet the mandates of the ALWTRP and the May 2008 BiOp. During right whale calving season (15 November to 15

April), 100 percent observer coverage is required for shark gillnet vessels operating from West Palm Beach, FL, to Sebastian Inlet, FL. Outside right whale calving season, observer coverage is equal to that which would obtain a sample size needed to provide estimates of sea turtle or marine mammal interactions with an expected CV of 0.3 (Carlson and Baremore, 2002a).

NMFS implemented the final rule on June 25, 2007 (72 FR 34632), that prohibits gillnet fishing, including shark gillnet fishing, from November 15 to April 15, between the NC/SC border and 29° 00' N. The action was taken to prevent the significant risk to the wellbeing of endangered right whales from entanglement in gillnet gear in the core right whale calving area during calving season. Limited exemptions to the fishing prohibitions are provided for gillnet fishing for sharks and for Spanish mackerel south of 29°00' N. lat. Shark gillnet vessels fishing between 29° 00' N and 26° 46.5' N have certain requirements as outlined 50 CFR § 229.32 from December 1 through March 31 of each year. These include vessel operators contacting the SEFSC Panama City Laboratory at least 48 hours prior to departure of a fishing trip in order to arrange for an observer.

In addition, a recent rule (October 5, 2007, 72 FR 57104) amends restrictions in the Southeast U.S. Monitoring Area from December 1 through March 31. In that area no person may fish with or possess gillnet gear for sharks with webbing of 5" or greater stretched mesh unless the operator of the vessel is in compliance with the VMS requirements found in 50 CFR 635.69. The Southeast U.S. Monitoring Area is from 27°51' N. (near Sebastian Inlet, FL) south to 26°46.5' N. (near West Palm Beach, FL), extending from the shoreline or exemption line eastward to 80°00' W. In addition, NMFS may select any shark gillnet vessel regulated under the ALWTRP to carry an observer. When selected, the vessels are required to take observers on a mandatory basis in compliance with the requirements for at-sea observer coverage found in 50 CFR 229.7. Any vessel that fails to carry an observer once selected is prohibited from fishing pursuant to 50 CFR § 635. There are additional gear marking requirements that can be found at 50 CFR § 229.32.

Starting in 2005, a pilot observer program began to include all vessels that have an active directed shark permit and fish with sink gillnet gear (Carlson and Bethea, 2006). These vessels were not subject to observer coverage because they were either targeting non-HMS or were not fishing gillnets in a drift or strike fashion. These vessels were selected for observer coverage in an effort to determine their impact on finetooth shark landings and their overall impact on shark resources when not targeting sharks.

#### ***3.9.2.4 Recreational Handgear Fishery***

NMFS collects recreational catch-and-release data from dockside surveys (LPS and MRFSS) for the rod and reel fishery and uses these data to estimate total landings and discards of bycatch or incidental catch. Statistical problems associated with small sample size remain an obstacle to estimating bycatch reliably in the rod and reel fishery. CVs can be high for many HMS (rare event species in MRFSS) and LPS does not cover all times/geographic areas for non-bluefin tuna species. New survey methodologies are being developed, especially for the charter/headboat sector of the rod and reel fishery, which should help to address some of the problems in estimating bycatch for this fishery. In addition, selecting recreational vessels for

voluntary logbook reporting may be an option for collecting bycatch information for this sector of the HMS fishery.

NMFS has the authority to use observers to collect bycatch information from vessels with HMS Charter/Headboat or Angling category permits. Many of the charter/headboat vessels are required to complete federal and/or state logbooks (*e.g.*, the NMFS Northeast Region VTR Program), in which they are required to report all fishing information, including that for HMS and bycatch. NMFS is currently evaluating various alternatives to increase logbook coverage of vessels fishing for HMS, such as selecting additional HMS vessels to report in logbooks or be selected for observer coverage, and is investigating alternatives for electronic reporting.

The National Academy of Sciences (NAS) assembled a committee to review current marine recreational fishing surveys at the request of NMFS (NAS, 2006). The committee was tasked with developing recommendations for improvements to current surveys and to recommend the implementation of possible alternative approaches. The committee's final report was published in April 2006. Based on recommendations made by the National Research Council, a new, nationwide system to standardize recreational data collection has begun. This has been termed the Marine Recreational Information Program (MRIP), and the program focuses on integrating state and federal level recreational permit information to create a resource for targeted surveys of anglers' catch and effort.

### **3.9.3 Bycatch Reduction in HMS Fisheries**

The NMFS HMS bycatch reduction program includes an evaluation of current data collection programs, implementation of bycatch reduction measures such as gear modifications and time/area closures, and continued support of data collection and research relating to bycatch. Additional details on bycatch and bycatch reduction measures can be found in Section 3.5 of the 1999 FMP for Atlantic Tunas, Swordfish and Sharks (NMFS, 1999), in Regulatory Amendment 1 to the 1999 FMP for Atlantic Tunas, Swordfish and Sharks (NMFS, 2000), in Regulatory Adjustment 2 to the 1999 FMP for Atlantic Tunas, Swordfish and Sharks (NMFS, 2002), in Amendment 1 to the 1999 FMP for Atlantic Tunas, Swordfish and Sharks (NMFS, 2003a), the June 2004 Final Rule for Reduction of Sea Turtle Bycatch and Bycatch Mortality in the Atlantic PLL Fishery (69 FR 40734), the 2006 Consolidated HMS FMP (NMFS, 2006a), Amendment 2 to the 2006 Consolidated HMS FMP (NMFS, 2008a), and Section 3.9 of this chapter. In addition, an HMS Bycatch Reduction Implementation Plan was developed in late 2003 which identify priority issues to be addressed in the following areas: 1) monitoring, 2) research, 3) management, and 4) education/outreach. Individual activities in each of these areas were identified and new activities may be added or removed as they are addressed or identified.

### **3.10 Evaluation and Monitoring of Bycatch**

The identification of bycatch in Atlantic HMS fisheries is the first step in reducing bycatch and bycatch mortality. The Magnuson-Stevens Act requires the amount and type of bycatch to be summarized in the annual SAFE reports.

PLL dead discards of LCS and pelagic sharks are estimated using data from NMFS observer reports and pelagic logbook reports. Shark BLL and shark gillnet discards can be

estimated using logbook data and observer reports as well. Shark gillnet discards have also been estimated using logbook data when observer coverage is equal to 100 percent.

### **3.10.1 Bycatch Mortality**

#### ***3.10.1.1 Introduction***

The reduction of bycatch mortality is an important component of NS 9. Physical injuries may not be apparent to the fisherman who is quickly releasing a fish because there may be injuries associated with the stress of being hooked or caught in a net. Little is known about the mortality rates of many shark species but there are some data for certain species. Information on bycatch mortality should continue to be collected, and in the future, could be used to estimate bycatch mortality in stock assessments. For a summary of bycatch species in BLL and gillnet fisheries, please refer to Table 3.43. For all other fisheries, please refer to Table 3.107 in the Consolidated HMS FMP.

NMFS submits annual data (Task II) to ICCAT on mortality estimates (dead discards). These data are included in the SAFE Reports and National Reports to ICCAT to evaluate bycatch trends in HMS fisheries.

**Table 3.43 Summary of bycatch species in HMS fisheries, Marine Mammal Protection Act (MMPA) category, Endangered Species Act (ESA) requirements, data collection, and management measures by fishery/gear type.**

(Excerpted from HMS Bycatch Priorities and Implementation Plan and updated through September 2008)

<b>Fishery/Gear Type</b>	<b>Bycatch Species</b>	<b>MMPA Category</b>	<b>ESA Requirements</b>	<b>Bycatch Data Collection</b>	<b>Management Measures</b>
Shark Bottom Longline	Prohibited shark species Target species after closure Sea turtles Smalltooth sawfish Non-target finfish	Category III	ITS, Terms & Conditions, RPMs	Permit requirement (1993); logbook requirement (1993); observer coverage (1994)	Quotas (1993); trip limit (1994); gear marking (1999); handling & release guidelines (2001); line clippers, dipnets, corrodible hooks, de-hooking devices, move 1 nm after an interaction (2004); South Atlantic closure, VMS (2005); shark identification workshops for dealers (2007); sea turtle control device (2008)
Shark Gillnet	Prohibited shark species Sea turtles Marine mammals Non-target finfish Smalltooth sawfish	Category II	ITS, Terms & Conditions, RPMs	Permit requirement (1993); logbook requirement (1993); observer coverage (1994)	Quotas (1993); trip limit (1994); gear marking (1999); deployment restrictions (1999); 30-day closure for leatherbacks (2001); handling & release guidelines (2001); net checks (2002); whale sighting (2002); VMS (2004); closure for right whale mortality (2006); shark identification workshops for dealers (2007)
Pelagic Longline	Bluefin tuna Billfish Undersize target species Marine mammals Sea turtles Seabirds Non-target finfish Prohibited shark species Large Coastal Shark species after closure	Category I	Jeopardy findings in 2000 & 2004; Reasonable and Prudent Alternative implemented 2001-04; ITS, Terms & Conditions, RPMs	Permit requirement (1985); logbook requirement (SWO-1985; SHK - 1993); observer requirement (1992), EFPs (2001-present)	BFT target catch requirements (1981); quotas (SWO - 1985; SHK - 1993); prohibit possession of billfish (1988); minimum size (1995); gear marking (1999); line clippers, dipnets (2000); MAB closure (1999); limited access (1999); limit the length of mainline (1996-1997 only); move 1 nm after an interaction (1999); voluntary vessel operator workshops (1999); GOM closure (2000); FL, Charleston Bump, NED closures (2001); gangion length, corrodible hooks, de-hooking devices, handling & release guidelines (2001); NED experiment (2001-03); VMS (2003); circle hooks and bait requirements (2004); mandatory safe handling and release workshops (2006); sea turtle control device (2008); closed area research (2008)

### ***3.10.1.2 Mortality by Fishery***

#### *Bottom Longline Fishery*

The shark BLL fishery has relatively low observed bycatch rates. Historically, finfish bycatch has averaged approximately 6.4 percent in the Gulf of Mexico region and 2.3 percent in the Atlantic region for the BLL fishery. Observed protected species bycatch (sea turtles) has typically been much lower, less than 0.01 percent of the total observed catch. See Section 3.4.1.3 for more information. Disposition of discards is recorded by observers and can be used to estimate discard mortality.

#### *Shark Gillnet Fishery*

During 2008, the shark gillnet fishery, for the 68 observed shark directed sets, exhibited a 22.2 percent bycatch of finfish and a 0 percent catch of protected species (sea turtles and marine mammals). See Section 3.4.2.2 for more information. Disposition of discards is recorded by observers and can be used to estimate discard mortality.

For PLL and recreational handgear mortality summaries, please refer to Section 3.9.8.2 of the 2006 Consolidated HMS FMP.

### ***3.10.1.3 Code of Angling Ethics***

NMFS developed a Code of Angling Ethics as part of implementing Executive Order 12962 – Recreational Fisheries. NMFS implemented a national plan to support, develop, and implement programs that were designed to enhance public awareness and understanding of marine conservation issues relevant to the wellbeing of fishery resources in the context of marine recreational fishing. This code is consistent with NS 9, minimizing bycatch and bycatch mortality. These guidelines are discretionary, not mandatory, and are intended to inform the angling public of NMFS views regarding what constitutes ethical angling behavior. Part of the code covers catch-and-release fishing and is directed towards minimizing bycatch mortality. For a detailed description of the code, please refer to Section 3.9.8.3 of the 2006 Consolidated HMS FMP.

## **3.10.2 HMS Fishing Gears with Protected Species**

This section examines the interaction between protected species and Atlantic HMS fisheries managed under this FMP. As a point of clarification, interactions are different than bycatch. Interactions take place between fishing gears and marine mammals, and seabirds while bycatch consists of the incidental take and discards of non-targeted finfish, shellfish, mollusks, crustaceans, sea turtles, and any other marine life other than marine mammals and seabirds. Following a brief review of the three acts (Marine Mammal Protection Act, Endangered Species Act, and Migratory Bird Treaty Act) affecting protected species, the interactions between HMS gears and each species is examined. Additionally, the interaction of seabirds and longline fisheries are considered under the auspices of the United States “National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries” (NPOA – Seabirds).

### 3.10.2.1 Interactions and the MMPA

The MMPA of 1972 as amended is one of the principal federal statutes that guides marine mammal species protection and conservation policy. In the 1994 amendments, section 118 established the goal that the incidental mortality or serious injury of marine mammals occurring during the course of commercial fishing operations be reduced to insignificant levels approaching a zero mortality rate goal (ZMRG) and serious injury rate within seven years of enactment (*i.e.*, April 30, 2001). In addition, the amendments established a three-part strategy to govern interactions between marine mammals and commercial fishing operations. These include the preparation of marine mammal stock assessment reports, a registration and marine mammal mortality monitoring program for certain commercial fisheries (Category I and II), and the preparation and implementation of take reduction plans (TRP).

NMFS relies on both fishery-dependent and fishery-independent data to produce stock assessments for marine mammals in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea. Draft stock assessment reports are typically published around January and final reports are typically published in the fall. Final 2008 stock assessment reports can be obtained on the web at: <http://www.nmfs.noaa.gov/pr/sars/species.htm> while draft 2009 stock assessment reports are available at: <http://www.nmfs.noaa.gov/pr/sars/draft.htm>.

The following list of species outlines the marine mammal species that occur off the Atlantic and Gulf Coasts that are or could be of concern with respect to potential interactions with HMS fisheries.

<b><u>Common Name</u></b>	<b><u>Scientific Name</u></b>
Atlantic spotted dolphin	<i>Stenella frontalis</i>
Blue whale	<i>Balaenoptera musculus</i>
Bottlenose dolphin	<i>Tursiops truncatus</i>
Common dolphin	<i>Delphinis delphis</i>
Fin whale	<i>Balaenoptera physalus</i>
Harbor porpoise	<i>Phocoena phocoena</i>
Humpback whale	<i>Megaptera novaeangliae</i>
Killer whale	<i>Orcinus orca</i>
Long-finned pilot whale	<i>Globicephela melas</i>
Minke whale	<i>Balaenoptera acutorostrata</i>
Northern bottlenose whale	<i>Hyperoodon ampullatus</i>
Northern right whale	<i>Eubalaena glacialis</i>
Pantropical spotted dolphin	<i>Stenella attenuata</i>
Pygmy sperm whale	<i>Kogia breviceps</i>
Risso's dolphin	<i>Grampus griseus</i>
Sei whale	<i>Balaenoptera borealis</i>
Short-beaked spinner dolphin	<i>Stenella clymene</i>
Short-finned pilot whale	<i>Globicephela macrorhynchus</i>
Sperm whale	<i>Physeter macrocephalus</i>
Spinner dolphin	<i>Stenella longirostris</i>
Striped dolphin	<i>Stenella coeruleoalba</i>
White-sided dolphin	<i>Lagenorhynchus acutus</i>

Under MMPA requirements, NMFS produces an annual list of fisheries (LOF) that classifies domestic commercial fisheries, by gear type, relative to their rates of incidental mortality or serious injury of marine mammals. The LOF includes three classifications:

1. Category I fisheries are those with frequent serious injury or incidental mortality to marine mammals;
2. Category II fisheries are those with occasional serious injury or incidental mortality; and
3. Category III fisheries are those with remote likelihood of serious injury or known incidental mortality to marine mammals.

The final 2009 MMPA LOF was published on November 16, 2009 (74 FR 58859). The Atlantic Ocean, Caribbean, and Gulf of Mexico large pelagic longline fishery is classified as Category I (frequent serious injuries and mortalities incidental to commercial fishing) and the southeastern Atlantic shark gillnet fishery is classified as Category II (occasional serious injuries and mortalities). The following Atlantic HMS fisheries are classified as Category III (remote likelihood or no known serious injuries or mortalities): Atlantic tuna purse seine; Gulf of Maine and Mid-Atlantic tuna, shark and swordfish, hook-and-line/harpoon; southeastern Mid-Atlantic and Gulf of Mexico shark bottom longline; and Mid-Atlantic, southeastern Atlantic, and Gulf of Mexico pelagic hook-and-line/harpoon fisheries. Commercial passenger fishing vessel (charter/headboat) fisheries are subject to Section 118 and are listed as a Category III fishery. Recreational vessels are not categorized since they are not considered commercial fishing vessels. Beginning with the 2009 LOF, high seas fisheries are included in the LOF. Many fisheries operate in both U.S. waters and on the high seas thereby making the high seas component an extension of a fishery already on the LOF. NMFS categorizes the majority of high seas fisheries on the LOF as Category II based on the lack of marine mammal stock abundance information from the high seas. Exceptions to this are high seas fisheries that also operate in U.S. waters that have already been categorized as I, II, or III. For additional information on the fisheries categories and how fisheries are classified, see <http://www.nmfs.noaa.gov/pr/interactions/lof/>.

Fishermen participating in Category I or II fisheries are required to register under the MMPA and to accommodate an observer aboard their vessels if requested. Vessel owners or operators, or fishermen, in Category I, II, or III fisheries must report all incidental mortalities and serious injuries of marine mammals during the course of commercial fishing operations to NMFS. There are currently no regulations requiring recreational fishermen to report takes, nor are they authorized to have incidental takes (*i.e.*, they are illegal).

NMFS continues to investigate serious injuries to marine mammals as they are released from fishing gear. In April 1999, NMFS held a joint meeting of the three regional scientific review groups to further discuss the issue. NMFS is continuing to develop marine mammal serious injury guidelines and until these are published, NMFS will apply the criteria listed by the review groups to make determinations for specific fisheries. The current BiOps for Atlantic HMS fisheries have resulted in a conclusion of no jeopardy for marine mammals. The 1999 HMS FMP implemented several of the recommendations of the Atlantic Offshore Cetacean Take Reduction Team (AOCTRT) including: 1) a requirement that vessels fishing for HMS move one

nautical mile (nm) after an entanglement with protected species; 2) limiting the length of the mainline to 24 nm in the MAB from August 1, 1999 through November 30, 2000; 3) voluntary vessel operator education workshops for HMS pelagic longline vessels; 4) handling and release guidelines; and 5) limited access for swordfish, shark and tuna longline permits.

More recently, a Pelagic Longline Take Reduction Team (PLTRT) was formed which replaced the disbanded AOCTRT. The PLTRT developed a draft Take Reduction Plan (TRP) and was published along with a proposed rule to implement it on June 24, 2008 (73 FR35623). The final TRP was published on May 19, 2009 (74 FR 23349). The TRP implemented a suite of management strategies to reduce mortality and serious injury of pilot whales and Risso's dolphins in the Atlantic pelagic longline fishery. NMFS finalized the following three regulatory measures: (1) establish a Cape Hatteras Special Research Area (CHSRA), with specific observer and research participation requirements for fishermen operating in that area; (2) set a 20-nm (37.02-km) upper limit on mainline length for all pelagic longline sets within the MAB; and (3) require an informational placard on handling and release of marine mammals be displayed both in the wheelhouse and on the working deck of all active pelagic longline vessels in the Atlantic fishery. NMFS also finalized the following non-regulatory measures: (1) increased observer coverage in the MAB to 12-15 percent to ensure representative sampling of pilot whales and Risso's dolphins; (2) encourage vessel operators to maintain daily communication with other local vessel operators regarding protected species interactions throughout the PLL fishery with the goal of identifying and exchanging information relevant to avoiding protected species bycatch; (3) recommending that NMFS update the guidelines for handling and releasing marine mammals and NMFS and the industry to develop new technologies, equipment, and methods for safer and more effective handling and release of marine mammals; and (4) recommending NMFS pursue research and data collection goals in the PLTRT regarding pilot whales and Risso's dolphins. More information on the PLTRT can be found at <http://www.nmfs.noaa.gov/pr/interactions/trt/pl-trt.htm>.

### **3.10.2.2 Interactions and the ESA**

The ESA of 1973 as amended (16 U.S.C. 1531 *et seq.*) provides for the listing of species determined by the USFWS or NOAA to be threatened or endangered throughout all or a portion of their range and the designation of critical habitat for such species, prohibition on unauthorized or unpermitted take, and for avoiding jeopardy and ultimately conserving and recovering listed species of fish, wildlife, and plants. The listing of a species is based on the status of the species throughout its range or in a specific portion of its range in some instances. Threatened species are those likely to become endangered in the foreseeable future [16 U.S.C. §1532(20)] if no action is taken to stop the decline of the species. Endangered species are those in danger of becoming extinct throughout all or a significant portion of their range [16 U.S.C. §1532(20)]. Species can be listed as endangered without first being listed as threatened. The Secretary of Commerce, acting through NMFS, is authorized to list marine and anadromous fish species, marine mammals (except for walrus and sea otter), marine reptiles (such as sea turtles), and marine plants. The Secretary of the Interior, acting through the USFWS, is authorized to list walrus and sea otter, seabirds, terrestrial plants and wildlife, and freshwater fish and plant species, among other species.

In addition to listing species under the ESA, the service agency (NMFS or USFWS) generally must designate critical habitat for listed species concurrently with the listing decision to the “maximum extent prudent and determinable” [16 U.S.C. §1533(a)(3)]. The ESA defines critical habitat as those specific areas that are occupied by the species at the time it is listed that are essential to the conservation of a listed species and that may be in need of special consideration, as well as those specific areas that are not occupied by the species that are essential to their conservation. Federal agencies are prohibited from undertaking actions that are likely to result in jeopardy to a listed species or destroy or adversely modify designated critical habitat or taking species in the absence of an incidental take statement included in a BiOp. Federal agencies carry out their duties under the ESA to avoid jeopardy, receive authorization for incidental take, and provide for conservation and recovery of species through formally consulting with either NMFS or the USFWS, depending on the species at issue under Section 7 of the ESA. Formal Section 7 consultation concludes with the USFWS or NMFS issuing a BiOp evaluating the effects of the proposed action to listed species, determining whether there is a likelihood of jeopardy, including an incidental take statement authorizing a specific level of take, requiring terms and conditions and implementing reasonable and prudent measures for incidental take, and recommendations for conservation measures. If the BiOp concludes that the action is likely to jeopardize a listed species, USFWS or NMFS must suggest reasonable and prudent alternatives to implement the proposed action without jeopardizing the species. The following is a list of endangered or threatened species that have critical habitat listed within the proposed action area.

**Marine Mammals**

	<b><u>Status</u></b>
Blue whale ( <i>Balaenoptera musculus</i> )	Endangered
Fin whale ( <i>Balaenoptera physalus</i> )	Endangered
Humpback whale ( <i>Megaptera novaeangliae</i> )	Endangered
Northern right whale ( <i>Eubalaena glacialis</i> )	Endangered
Sei whale ( <i>Balaenoptera borealis</i> )	Endangered
Sperm whale ( <i>Physeter macrocephalus</i> )	Endangered

**Sea Turtles**

Green turtle ( <i>Chelonia mydas</i> )	*Endangered/Threatened
Hawksbill sea turtle ( <i>Eretmochelys imbricata</i> )	Endangered
Kemp’s ridley sea turtle ( <i>Lepidochelys kempii</i> )	Endangered
Leatherback sea turtle ( <i>Dermochelys coriacea</i> )	Endangered
Loggerhead sea turtle ( <i>Caretta caretta</i> )	Threatened
Olive ridley sea turtle ( <i>Lepidochelys olivacea</i> )	Threatened

**Critical Habitat**

Northern right whale	Endangered
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**Finfish**

Smalltooth sawfish ( <i>Pristis pectinata</i> ) <sup>†</sup>	Endangered
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\*Green sea turtles in U.S. waters are listed as threatened except for the Florida breeding population, which is listed as endangered. Due to the inability to distinguish between the populations away from the nesting beaches, green sea turtles are considered endangered wherever they occur in U.S. waters.

†U.S. Distinct Population Segment

## *Sea Turtles*

NMFS has taken several steps in the past few years to reduce sea turtle bycatch and bycatch mortality in domestic longline fisheries. On March 30, 2001, NMFS implemented via interim final rule requirements for U.S. flagged vessels with PLL gear on board to have line clippers and dipnets to remove gear on incidentally captured sea turtles (66 FR 17370). Specific handling and release guidelines designed to minimize injury to sea turtles were also implemented. NMFS published a final report which provides the detailed guidelines and protocols (NMFS, 2008d) and a copy can be found at [http://www.nmfs.noaa.gov/sfa/hms/Protected%20Resources/TM580\\_color\\_standard\\_1\\_7\\_09.pdf](http://www.nmfs.noaa.gov/sfa/hms/Protected%20Resources/TM580_color_standard_1_7_09.pdf).

A BiOp completed on June 14, 2001, found that the actions of the PLL fishery jeopardized the continued existence of loggerhead and leatherback sea turtles. This document reported that the PLL fishery interacted with an estimated 991 loggerhead and 1,012 leatherback sea turtles in 1999. The estimated take levels for 2000 were 1,256 loggerhead and 769 leatherback sea turtles (Yeung, 2001). The BiOp provided RPAs and an Incidental take statement (ITS) for the continued operation of the fishery.

On July 13, 2001 (66 FR 36711), NMFS published an emergency rule that closed the NED area to PLL fishing (effective July 15, 2001), modified how PLL gear may be deployed effective August 1, 2001, and required that all longline vessels (pelagic and bottom) post safe handling guidelines for sea turtles in the wheelhouse. On December 13, 2001 (66 FR 64378), NMFS extended the emergency rule for 180 days through July 8, 2002. On July 9, 2002, NMFS published a final rule (67 FR 45393) that closed the NED to PLL fishing. As part of the Reasonable and Prudent Alternative, the BiOp required NMFS to conduct an experiment with commercial fishing vessels to test fishery-specific gear modifications to reduce sea turtle bycatch and mortality. This rule also required the length of any gangions to be 10 percent longer than the length of any floatline on vessels where the length of both is less than 100 meters; prohibited stainless steel hooks; and required gillnet vessel operators and observers to report any whale sightings and required gillnets to be checked every 0.5 to 2 hours.

The experimental program required in the BiOp was initiated in the NED area in 2001 in cooperation with the U.S. PLL fleet that historically fished on the Grand Banks fishing grounds. The goal of the experiment was to test and develop gear modifications that might prove useful in reducing the incidental catch and post-release mortality of sea turtles captured by PLL gear while striving to minimize the loss of target catch. The experimental fishery had a three-year duration and utilized 100 percent observer coverage to assess the effectiveness of the measures. The gear modifications tested in 2001 included blue-dyed squid and moving gangions away from floatlines. In 2002, the NED experimental fishery examined the effectiveness of whole mackerel bait, squid bait, circle and “J” hooks, and reduced daylight soak time in reducing the capture of sea turtles. The experiment tested various hook and bait type combinations in 2003 to verify the results of the 2002 experiment.

On November 28, 2003, based on the conclusion of the three-year NED experiment, and preliminary data that indicated that the Atlantic PLL fishery may have exceeded the Incidental Take Statement in the June 14, 2001 BiOp, NMFS published a Notice of Intent to prepare an SEIS to assess the potential effects on the human environment of proposed alternatives and

actions under a proposed rule to reduce sea turtle bycatch (68 FR 66783). A new BiOp for the Atlantic PLL fishery was completed on June 1, 2004 (NMFS, 2004f). The BiOp concluded that long-term continued operation of the Atlantic PLL fishery, authorized under the 1999 FMP, was not likely to jeopardize the continued existence of loggerhead, green, hawksbill, Kemp's ridley, or olive ridley sea turtles; and was likely to jeopardize the continued existence of leatherback sea turtles.

On July 6, 2004, NMFS implemented additional regulations for the Atlantic PLL fishery to further reduce the mortality of incidentally caught sea turtles (69 FR 40734). These measures include requirements on hook type, hook size, bait type, dipnets, line clippers, and safe handling guidelines for the release of incidentally caught sea turtles. These requirements were developed based on the results of the 2001 – 2003 NED experiment (Watson *et al.*, 2003; Watson *et al.*, 2004; Shah *et al.*, 2004). These requirements are predicted to decrease the number of total interactions, as well as the number of mortalities, of both leatherback and loggerhead sea turtles (NMFS, 2004e). Post-release mortality rates are expected to decline due to a decrease in the number of turtles that swallow hooks which engage in the gut or throat, a decrease in the number of turtles that are foul-hooked and improved handling and gear removal protocols. NMFS is working to export this new technology to PLL fleets of other nations to reduce global sea turtle bycatch and bycatch mortality. U.S gear experts have presented this bycatch reduction technology and data from research activities at approximately 15 international events that included fishing communities and resource managers between 2002 and mid-2005 (NMFS, 2005a).

On February 7, 2007, NMFS published a rule that required BLL vessels to carry the same dehooking equipment as the PLL vessels. To date, all bottom and PLL vessels with commercial shark permits are required to have NMFS-approved sea turtle dehooking equipment onboard (PLL: July 6, 2004, 69 FR 40734; BLL: February 7, 2007, 72 FR 5639).

A May 20, 2008 Biological Opinion (BiOp) issued under Section 7 of the ESA for Amendment 2 to the 2006 Consolidated HMS FMP concluded, based on the best available scientific information, that Amendment 2 to the Consolidated HMS FMP was not likely to jeopardize the continued existence of endangered green, leatherback, and Kemp's ridley sea turtles; the endangered smalltooth sawfish; or the threatened loggerhead sea turtle.

Internationally, the United States is pursuing sea turtle conservation through international, regional, and bilateral organizations such as ICCAT, the Asia Pacific Fishery Commission, and FAO Committee on Fisheries (COFI). The United States intends to provide a summary report to FAO for distribution to its members on bycatch of sea turtles in U.S. longline fisheries and the research findings as well as recommendations to address the issue. At the 24<sup>th</sup> session of COFI held in 2001, the United States distributed a concept paper for an international technical experts meeting to evaluate existing information on turtle bycatch, to facilitate and standardize collection of data, to exchange information on research, and to identify and consider solutions to reduce turtle bycatch. COFI agreed that an international technical meeting could be useful despite the lack of agreement on the specific scope of that meeting. The United States has developed a prospectus for a technical workshop to address sea turtle bycatch in longline fisheries as a first step. Other gear-specific international workshops may be considered in the future.

### *Smalltooth sawfish*

On April 1, 2003, NMFS listed smalltooth sawfish as an endangered species (68 FR 15674) under the ESA. After reviewing the best scientific data and commercial fisheries information, the status review team determined that the U.S. DPS (Distinct Population Segment) of smalltooth sawfish is in danger of extinction throughout all or a significant portion of its range from a combination of the following four listing factors: the present or threatened destruction, modification, or curtailment of habitat or range; over utilization for commercial, recreational, scientific, or educational purposes; inadequacy of existing regulatory mechanisms; and other natural or manmade factors affecting its continued existence. NMFS is working on designating critical habitat for smalltooth sawfish.

NMFS believes that smalltooth sawfish takes in the shark gillnet fishery are rare given the high rate of observer coverage. The fact that there were no smalltooth sawfish caught during 2001, when 100 percent of the fishing effort was observed, indicates that smalltooth sawfish takes (observed or total) most likely do not occur on an annual basis. Based on this information, the 2003 BiOp estimated that one incidental capture of a sawfish (released alive) over five years, would occur as a result of the use of gillnets in this fishery (NMFS, 2003a). The May 20, 2008, BiOp Amendment 2 to the 2006 Consolidated HMS FMP, which includes the shark BLL fishery, found that the shark BLL fishery was not likely to jeopardize the continued existence of endangered smalltooth sawfish. No smalltooth sawfish were observed in shark gillnet fisheries for 2007-08.

Smalltooth sawfish have been observed caught (eight known interactions, seven released alive, one released in unknown condition) in shark BLL fisheries from 1994 through 2004 (NMFS, 2003a). Based on these observations, expanded sawfish take estimates for 1994-2002 were developed for the shark BLL fishery (NMFS, 2003a). A total of 466 sawfish were estimated to have been taken in this fishery during 1994 - 2002, resulting in an average of 52 per year. All were released alive except one. Estimates of sawfish bycatch for 2003-06 have been developed and range from 0 to 161 interactions per year (Richards, 2007a; 2007b). However, due to the sparseness of observations (interactions) and effort variables chosen for the various approaches to estimating total interactions, the results were not very precise. A small BLL time-area closure to protect smalltooth sawfish southwest of Key West, FL was considered during the development of the 2006 Consolidated HMS FMP (NMFS, 2006a) but not implemented due to the lack of information regarding critical habitat for this species. A proposed rule to designate critical habitat for smalltooth sawfish was published on November 20, 2008 (73 FR 70290).

### *Interactions with Seabirds*

Observer data indicate that seabird bycatch is relatively low in the U.S. Atlantic pelagic longline fishery (NMFS, 2009). Since 1992, a total of 142 seabird interactions have been observed, with 101 observed killed (71.6 percent). In 2007, there were 121 active U.S. pelagic longline vessels fishing for swordfish in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea that reportedly set approximately 6.1 million hooks. A total of one seabird was observed taken, a brown pelican which was released alive. Extrapolated estimates of seabird bycatch have varied substantially since 1992, ranging from 0 in 1996 to a high of 1,109 in 1997. The average extrapolated estimate of seabird bycatch was 210 per year while the extrapolated estimate of

dead seabird bycatch was 150 per year, ranging from 0 to 623. Live discards ranged from zero to 486 per year, averaging 60 per year. Estimates of dead discards of seabirds ranged from zero to 623 per year, averaging 150 per year. The annual bycatch rate of birds discarded dead ranged from zero to 0.015 birds per 1,000 hooks, while the rate of total seabird catch ranged from zero to 0.106 birds per 1,000 hooks.

The NPOA for Reducing the Incidental Catch of Seabirds in Longline Fisheries was released in February 2001. The NPOA for Seabirds calls for detailed assessments of longline fisheries, and, if a problem is found to exist within a longline fishery, for measures to reduce seabird bycatch within two years. NMFS, in collaboration with the appropriate Councils and in consultation with the USFWS, will prepare an annual report on the status of seabird mortality for each longline fishery. The United States is committed to pursuing international cooperation, through the Department of State, NMFS, and U.S. Fish and Wildlife Service, to advocate the development of National Plans of Action within relevant international fora. NMFS intends to meet with longline fishery participants and other members of the public in the future to discuss possibilities for complying with the intent of the plan of action. Because interactions appear to be relatively low in Atlantic HMS fisheries, the adoption of immediate measures is unlikely.

Gannets, gulls, greater shearwaters, and storm petrels are occasionally hooked by Atlantic pelagic longlines. These species and all other seabirds are protected under the Migratory Bird Treaty Act. Seabird populations are often slow to recover from excess mortality as a consequence of their low reproductive potential (one egg per year and late sexual maturation). The majority of longline interactions with seabirds occur as the gear is being set. The birds eat the bait and become hooked on the line. The line then sinks and the birds are subsequently drowned.

Bycatch of seabirds in the shark BLL fishery has been virtually non-existent. A single pelican has been observed killed from 1994 through 2008. No expanded estimates of seabird bycatch or catch rates for the BLL fishery have been made due to the rarity of seabird takes.

### **3.10.3 Measures to Address Protected Species Concerns**

NMFS has taken a number of actions designed to reduce interactions with protected species over the last few years. Bycatch reduction measures have been implemented through the Fishery Management Plan for Atlantic Tunas, Swordfish and Sharks (NMFS, 1999), in Regulatory Amendment 1 to the 1999 FMP (NMFS, 2000), in Regulatory Adjustment 2 to the 1999 FMP (NMFS, 2002), in Amendment 1 to the 1999 FMP (NMFS, 2003a), and in the June 2004 Final Rule for Reduction of Sea Turtle Bycatch and Bycatch Mortality in the Atlantic Pelagic Longline Fishery (69 FR 40734). NMFS closed the Southeast U.S. Restricted Area to gillnet fisheries from February 15, 2006, to March 31, 2006, as a result of an entanglement and subsequent mortality of a right whale with gillnet gear (71 FR 8223). NMFS also closed eight Marine Protected Areas under Amendment 2 to the 2006 Consolidated HMS FMP (73 FR 35778 corrected 73 FR 40658). NMFS continues to monitor observed interactions with marine mammals and sea turtles on a quarterly basis and reviews data for appropriate action, if any, as necessary. A final rule requiring the possession and use of an additional sea turtle control device as an addition to the existing requirements for sea turtle bycatch mitigation gear in pelagic and bottom longline fisheries was effective October 23, 2008 (73 FR 54721). NMFS finalized the

PLTRT TRP effective June 18, 2009 (74 FR 23349) which implemented a suite of management strategies to reduce mortality and serious injury of pilot whales and Risso's dolphins in the Atlantic pelagic longline fishery.

**Table 3.44 Estimated sea turtle interactions by species in the US Atlantic pelagic longline fishery, 1999-2008, and Incidental Take Levels (ITS).**

PLL Fishery	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	3 year ITS, 2004-06 / 2007-09
											Total
Leatherback	1,016	769	1,208	962	1,112	1,362	368	415	500	385	1,981 / 1,764
Loggerhead	994	1,256	312	575	727	733	282	558	542	772	1,869 / 1,905
Other/Unidentified Sea Turtles	66	128	0	50	38	0	0	11	1	0	35 / 35
Marine Mammals	422	403	177	201	300	164	372	313	151	265	NA

### 3.10.4 Bycatch of HMS in Other Fisheries

NMFS is concerned about bycatch mortality of Atlantic HMS in any federal or state-managed fishery which captures them. NMFS plans to address bycatch of these species in the appropriate FMPs through coordination with the responsible management body. For example, capture of swordfish and tunas incidental to squid trawl operations is addressed in the Squid, Mackerel, and Butterfish FMP. Capture rates of tunas in coastal gillnet fisheries are being explored through issuance of exempted fishing permits and reporting requirements. NMFS continues to solicit bycatch data on HMS from all state, interjurisdictional, and federal data collection programs. NMFS supports development of an interstate management plan for coastal sharks by the ASMFC to protect sharks caught incidentally in state-managed fisheries. NMFS has requested assistance from the ASMFC, GSMFC, and Atlantic and Gulf Regional Fishery Management Councils in identifying potential sources of bycatch of finetooth sharks in state waters fisheries or other fisheries outside the jurisdiction of this FMP.

#### 3.10.4.1 Shrimp Trawl Fishery

Shark bycatch in the shrimp trawl fishery consists mainly of sharks too small to be highly valued in the commercial market. As a result, few sharks are retained. Bycatch estimates of LCS in this fishery have been generated and were reviewed in the most recent LCS assessment (Table 3.45) (SEDAR 11, 2006). Bycatch estimates of the SCS complex were generated for both the GOM and SA shrimp trawl fisheries for the most recent SCS stock assessment. Requirements for turtle excluder devices in these fisheries have probably resulted in less bycatch because sharks are physically excluded from entering the gear. Bycatch of the SCS complex in the Gulf of Mexico shrimp trawl fishery consists mainly of Atlantic sharpnose and bonnethead sharks (SEDAR 13, 2007). However, approximately 45 percent of blacknose shark mortality occurs in the Gulf of Mexico shrimp trawl fishery. Finetooth sharks were added as a select species for the shrimp trawl observer program in 2005 to help determine if this fishery has bycatch of finetooth sharks. Prior to this, data on finetooth shark bycatch was not recorded.

**Table 3.45** Estimates of bycatch (numbers of fish) of small coastal sharks in the U.S. south Atlantic and Gulf of Mexico shrimp trawl fisheries and bottom longline fishery relative to total catch.  
Source: SEDAR 13, 2007.

Year	Shrimp Bycatch (GOM)	Percent of Total Catch (GOM)	Shrimp Bycatch (SA)	Percent of Total Catch (SA)	Bottom Longline Discards	Percent of Total Catch	Total Catch
1992	1172572	81.9	147409	10.3			1431810
1993	509360	76.4	64034	9.6			666956
1994	443215	69.3	55718	8.7			639406
1995	1051681	69.2	132211	8.7	32494	2.1	1520508
1996	920627	71.7	115736	9.0	15627	1.2	1284416
1997	703350	63.2	88421	7.9	9035	0.8	1113361
1998	806300	65.7	101363	8.3	9038	0.7	1228131
1999	641017	59.9	80585	7.5	14379	1.3	1070164
2000	796602	61.9	100144	7.8	22196	1.7	1286476
2001	641786	55	80682	6.9	14365	1.2	1167231
2002	1104353	69.2	138833	8.7	24906	1.6	1595703
2003	544058	59.1	68396	7.4	26518	2.9	919918
2004	797000	67.1	101330	8.5	30165	2.5	1188402
2005	530943	59.9	66893	7.5	29020	3.3	886732

**Table 3.46** Estimates of bycatch (numbers of fish) of blacknose sharks in the U.S. south Atlantic and Gulf of Mexico shrimp trawl fisheries and bottom longline fishery relative to total catch.  
Source: SEDAR 13, 2007.

Year	Shrimp Bycatch (GOM)	Percent of Total Catch (GOM)	Shrimp Bycatch (SA)	Percent of Total Catch (SA)	Bottom Longline Discards	Percent of Total Catch	Total Catch
1992	38197	79.3	4802	10	-	-	48198
1993	15514	76.3	1950	9.6	-	-	20339
1994	27351	60.4	3438	7.6	-	-	45253
1995	40316	58.3	5068	7.3	5181	7.5	69191
1996	35295	45.1	4437	5.7	2195	2.8	78322
1997	58309	47.7	7330	6	1869	1.5	122306
1998	34082	45.5	4285	5.7	2622	3.5	74856
1999	27461	41.4	3452	5.2	901	1.4	66273
2000	31556	30.4	3967	3.8	11321	10.9	103856
2001	45593	43.6	5732	5.5	3456	3.3	104537
2002	25400	33.7	3193	4.2	6623	8.8	75333
2003	54258	56.6	6821	7.1	5131	5.4	95801
2004	65546	62.4	8243	7.9	1999	1.9	105038
2005	20568	38.2	2586	4.8	5617	10.4	53835

### 3.10.5 Evaluation of Other Bycatch Reduction Measures

NMFS continues to monitor and evaluate bycatch in HMS fisheries through direct enumeration (PLL and BLL observer programs, shark gillnet observer program), evaluation of management measures (*e.g.*, closed areas, trip limits, gear modifications), and VMS.

The following section provides a review of additional management measures or issues that may address bycatch reduction:

#### *ALWTRP regulations*

Major changes to the ALWTRP were implemented in a final rule that published on October 5, 2007 (72 FR 57104). Regulations that affect HMS fisheries specifically gillnet fisheries, include: 1) a closed area for all gillnet fisheries from November 15 – April 15 from 29° 00' N to 32° 00' N from shore eastward to 80° 00' W and off SC, within 35 nautical miles of the coast (Southeast US Restricted Area North); 2) a restricted area from December 1 – March 31 from 27° 51' N to 29° 00' N from shore eastward to 80° 00' W (Southeast US Restricted Area South); 3) additional seasonal boundaries for EEZ waters east of 80° 00' W from 26° 46.50' N to 32° 00' N (Other Southeast Gillnet Waters); and 4) a monitoring area specific to the Atlantic shark gillnet fishery that extends from the area along the coast from 27° 51' N south to 26° 46.50' N eastward to 80° 00' W (Southeast US Monitoring Area) effective December 1 – March 31. Specific compliance requirements for fishing in these areas varies and are summarized in the Guide to the Atlantic Large Whale Take Reduction Plan. For additional information please see the ALWTRP website <http://www.nero.noaa.gov/whaletrp/index.html>.

#### *Atlantic Bottlenose Dolphin Take Reduction Team*

NMFS published a final rule on April 22, 2006, to implement the TRP. Included in the final rule are: 1) effort reduction measures; 2) gear proximity requirements; 3) gear or gear deployment modifications; and 4) outreach and education measures to reduce dolphin bycatch below the stock's potential biological removal level. The final rule also includes time/area closures and size restrictions on large mesh fisheries to reduce incidental takes of endangered and threatened sea turtles as well as to reduce dolphin bycatch.

#### *MMPA List of Fisheries Update/Stock Assessment*

NMFS continues to update the MMPA List of Fisheries and the 2008 final list is available. The final 2009 List of Fisheries published on December 1, 2008 (73 FR 73032). Final 2007 and draft 2008 stock assessment reports are available and can be obtained on the web at: [http://www.nmfs.noaa.gov/prot\\_res/PR2/Stock\\_Assessment\\_Program/sars.html](http://www.nmfs.noaa.gov/prot_res/PR2/Stock_Assessment_Program/sars.html).

#### *AOCTRT*

NMFS has disbanded the AOCTRT due to the fact that two of the three fisheries addressed by the AOCTRT were closed by fishery management actions, leaving only the PLL fishery in operation. This fishery has been the subject of recent fishery management actions and increased observer coverage related to bycatch. As discussed below, a take reduction team specific to the PLL fishery has been formed.

## *PLTRT*

NMFS appointed a PLTRT in June 2005, to address issues in the longline fishery and marine mammals, specifically pilot whales. A proposed rule to implement the TRP has been developed and published on June 24, 2008 (73 FR35623). The PLTRT recommended a suite of management strategies to reduce mortality and serious injury of pilot whales and Risso's dolphins in the Atlantic PLL fishery. NMFS proposed the following three regulatory measures: (1) Establish a Cape Hatteras Special Research Area (CHSRA), with specific observer and research participation requirements for fishermen operating in that area; (2) set a 20-nm (37.02-km) upper limit on mainline length for all pelagic longline sets within the MAB; and (3) develop and publish an informational placard that must be displayed in the wheelhouse and the working deck of all active pelagic longline vessels in the Atlantic fishery. The final rule for this action published May 19, 2009 (74 FR 23349).

## *VMS in the PLL fishery*

NMFS adopted fleet-wide VMS requirements in the Atlantic PLL fishery in May 1999, but was subsequently sued by an industry group. By order dated September 25, 2000, the U.S. District Court for the District of Columbia prevented any immediate implementation of VMS in the Atlantic PLL fishery, and instructed to "undertake further consideration of the scope of the [VMS] requirements in light of any attendant relevant conservation benefits." On October 15, 2002, the court issued a final order that denied plaintiff's objections to the VMS regulations. Based on this ruling, NMFS implemented the VMS requirement in September 2003.

## *VMS in other HMS fisheries*

Starting in 2004, gillnet vessels with a directed shark permit and gillnet gear onboard were required to install and operate a VMS unit during the Right Whale Calving Season (November 15 – March 31). In an attempt to better quantify bycatch, NMFS required all vessels with shark LAPs to participate in the Directed Shark Gillnet Observer program. Directed shark BLL vessels located between 33° N and 36° 30' N need to install and operate a VMS unit from January through July.

### **3.11 Effectiveness of Existing Time/Area Closures in Reducing Bycatch**

Since 2000, NMFS has implemented a number of time/area closures and gear restrictions in the Atlantic Ocean and Gulf of Mexico for the PLL fishery to reduce discards and bycatch of a number of species (*e.g.*, juvenile swordfish, bluefin tuna, billfish, sea turtles). Preliminary analyses of the effectiveness of these closures are summarized here.

The combined effects of the individual area closures and gear restrictions were examined by comparing the reported catch and discards from 2005-2008 to the averages for 1997-1999 throughout the entire U.S. Atlantic fishery. Previous analyses attempted to examine the effectiveness of the time/area closures only by comparing the 2001-2003 reported catch and discards to the base period (1997-1999) chosen and are included here as well for reference. The percent changes in the reported numbers of fish caught and discarded were compared to the predicted changes from the analyses in Regulatory Amendment 1 to the 1999 FMP (NMFS,

2000). Overall effort, expressed as the number of hooks reported set, declined by 28.6 percent from 1997-1999 (Table 3.47). Declines were noted for both the numbers of kept and discards of almost all species examined including swordfish, tunas, sharks, billfish, and sea turtles. The only positive changes from the base period were the numbers of bluefin tuna and dolphin kept and discarded. The reported number of bluefin tuna kept increased by 40.3 percent for 2005-2008 compared to 1997-1999 (Table 3.47). The number of reported discards of bluefin tuna increased by almost 24 percent between the same time periods, which is more than double the predicted 11 percent increase from the analyses in Regulatory Amendment 1. The number of dolphin kept and discarded increased slightly between time periods, although the absolute number of discards were relatively low (less than one thousand fish) (Table 3.47). Billfish (blue and white marlin, sailfish) discards reportedly decreased by 62.5 to 72.6 percent from 1997-1999 to 2005-2008 (Table 3.47). The reported discards of spearfish declined by 25 percent, although the absolute number of discards was also low (less than 200 fish). The reported number of turtle interactions decreased by 55.5 percent from 1997-1999 to 2005-2008.

**Table 3.47 Total number of swordfish, bluefin tuna, yellowfin tuna, bigeye tuna, total BAYS (bigeye, albacore, yellowfin and skipjack tuna), reported landed or discarded in the U.S. Atlantic PLL fishery, 1997 – 2008, and percent change from 1997-99.**

Predicted values from Regulatory Amendment 1 where Pred<sup>1</sup> = without redistribution of effort, Pred<sup>2</sup> = with redistribution of effort. Source: HMS Logbook data.

Year	Number of hooks set (x1000)	Swordfish kept	Swordfish discards	Bluefin tuna kept	Bluefin tuna discards	Yellowfin tuna kept	Yellowfin tuna discards	Bigeye tuna kept	Bigeye tuna discards	Total BAYS kept	Total BAYS discards
1997	9,674.5	69,222	20,555	207	706	76,211	1,869	21,985	1,618	105,553	4,264
1998	8,031.3	70,627	23,345	237	1,321	55,507	2,710	19,324	876	82,572	4,018
1999	7,893.6	67,544	20,656	270	604	85,307	2,889	22,615	906	116,306	4,389
2000	8,021.9	63,535	16,706	236	738	73,205	1,772	13,908	348	95,294	2,968
2001	7,742.3	49,236	14,448	183	348	53,751	1,811	18,976	559	82,997	3,806
2002	7,229.6	50,439	13,182	178	593	59,758	1,655	14,056	277	80,749	2,599
2003	7,120.4	52,838	12,089	275	881	51,988	2,015	7,539	348	64,601	2,802
2004	7,325.9	46,950	10,704	476	1,031	64,128	1,736	8,266	486	77,989	3,452
2005	5,922.6	41,239	11,158	376	766	43,833	1,316	8,383	369	57,237	2,545
2006	5,662.0	38,241	8,900	261	833	55,821	1,426	12,491	257	73,058	2,865
2007	6,290.6	45,933	11,823	357	1,345	56,062	1,452	8,913	249	70,390	3,031
2008	6,498.1	48,000	11,194	343	1,417	33,774	1,717	11,254	356	50,108	3,427
<b>Mean</b>											
<b>1997-99</b>	8,533.1	69,131	21,519	238	877	72,342	2,489	21,308	1,133	101,477	4,224
<b>A) 2001-03</b>	7,364.1	50,838	13,240	212	607	55,166	1,827	13,524	395	76,116	3,069
<b>B) 2005-07</b>	6,093.3	43,353	10,769	334	1,090	47,373	1,478	10,260	308	62,698	2,967
<b>% dif (A)</b>	-13.7	-26.5	-38.5	-10.9	-30.7	-23.7	-26.6	-36.5	-65.2	-25.0	-27.3
<b>% dif (B)</b>	-28.6	-37.3	-50.0	40.3	24.3	-34.5	-40.6	-51.8	-72.8	-38.2	-29.8
<b>Pred<sup>1</sup></b>		-24.6	-41.5		-1.0					-5.2	
<b>Pred<sup>2</sup></b>		-13.0	-31.4		10.7					10.0	

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**CHAPTER 4 TABLE OF CONTENTS**

**Chapter 4 Table of Contents.....4-i**  
**Chapter 4 List of Tables.....4-ii**  
**Chapter 4 List of Figures .....4-iii**  
**4.0 Environmental Consequences of Alternatives ..... 4-1**  
    4.1 Commercial Measures ..... 4-4  
        4.1.1 SCS Commercial Quotas ..... 4-4  
        4.1.2 Commercial Gear Restrictions..... 4-21  
        4.1.3 Pelagic Shark Effort Controls..... 4-26  
    4.2 Recreational Measures ..... 4-41  
        4.2.1 Small Coastal Sharks ..... 4-41  
        4.2.2 Pelagic Sharks..... 4-45  
    4.3 Smooth Dogfish ..... 4-52  
    4.4 Impacts on Essential Fish Habitat..... 4-71  
    4.5 Impacts on Protected Resources ..... 4-71  
    4.6 Environmental Justice..... 4-77  
    4.7 Coastal Zone Management Act..... 4-79  
    4.8 Cumulative Impacts ..... 4-83  
    4.9 Past, Present, and Reasonably Foreseeable Actions ..... 4-89  
    4.10 Cumulative Ecological Impacts ..... 4-100  
    4.11 Cumulative Social and Economic Impacts ..... 4-102  
**Chapter 4 References..... 4-105**

**CHAPTER 4 LIST OF TABLES**

Table 4.1 Sources of blacknose shark mortality, 1999-2005..... 4-6

Table 4.2 Average commercial landings of SCS from 2004-2008 in mt dw (lb dw). ..... 4-9

Table 4.3 Estimated landings and discards of blacknose sharks and non-blacknose SCS under alternative A3..... 4-10

Table 4.4 Estimated landings and discards of blacknose sharks and non-blacknose SCS under alternative A4..... 4-12

Table 4.5 Estimated landings and discards of blacknose sharks and non-blacknose SCS under Alternative A6..... 4-14

Table 4.6 Estimated Commercial Catches (mt) (ww) of Shortfin Mako Shark Reported to ICCAT (landings and discards) by Major Gear and Flag between 1997 and 2008 (NLD=No Landing Data)..... 4-28

Table 4.7 Comparison of commercial size limits for shortfin mako sharks (SFM), and their estimated affect on shortfin mako shark live releases. .... 4-33

Table 4.8 Comparison of commercial size limits for shortfin mako sharks (SFM), and their estimated affect on shortfin mako shark dead discards. .... 4-33

Table 4.9 Estimates of commercial and recreational landings and dead discards for shortfin mako sharks in the U.S. Atlantic, Gulf of Mexico, and Caribbean. (Source: ICCAT 2009) ..... 4-36

Table 4.10 Estimates of shortfin mako shark landings (lb dw) reductions according to size restrictions in alternatives C4a and C4b. .... 4-40

Table 4.11 Percentage of shortfin mako sharks with FL measurements reported as landed to the LPS from 2004 to 2008 under the current size limit and size limits in alternatives E2a and E2b..... 4-47

Table 4.12 Total number of shortfin mako sharks reported to the LPS from 2004 to 2008..... 4-50

Table 4.13 Comparison of the impacts of analyzed alternatives. .... 4-84

**CHAPTER 4 LIST OF FIGURES**

Figure 4.1 Interdorsal length measurement used for shortfin mako size limit analysis in alternatives C4a and C4b. ....4-31



#### 4.0 ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

In this FEIS NMFS analyzes commercial and recreational shark conservation and management measures which, if adopted, would serve as Amendment 3 to the 2006 Consolidated HMS FMP. The commercial management measures focus on three main categories, including: SCS commercial quotas (alternatives A1-A6); commercial gear restrictions (alternatives B1-B3); and pelagic shark effort controls (alternatives C1-C6). The recreational management measures focus on two categories: SCS (alternatives D1-D4) and pelagic sharks (alternatives E1-E5). Finally, there is a smooth dogfish section that focuses on commercial and recreational measures for smooth dogfish (alternatives F1-F3). All of the issues within these categories focus on management measures within the HMS Atlantic shark fishery. NMFS is also working in cooperation with the Gulf of Mexico Fishery Management Council (GMFMC) and the South Atlantic Fishery Management Council (SAFMC) regarding management measures in the shrimp trawl fisheries managed by the two Councils (Appendix E). Any changes in the shrimp trawl fisheries in the Gulf of Mexico and South Atlantic regions would be done through the Council process in separate fishery management plans. This chapter contains NMFS' assessment of the direct, indirect, and cumulative impacts of a full range of reasonable alternatives on the physical and human environment for the Atlantic shark fisheries in each category. This includes evaluation of the environmental impacts of a No Action alternative for each category.

##### *Data sources*

The following is a summary of the data sources described in more detail in Chapter 3. NMFS collects fishery-dependent data on sharks from a number of different sources which, evaluated with accepted models and methodologies, comprise the best scientific information available for evaluating effects of proposed FMP amendments. The following is a brief description of the data sources available to NMFS, and NMFS' rationale for choosing particular data sources as the best available data for this document.

NMFS uses two logbooks to collect information from commercial shark permit holders: the Coastal Fisheries logbook and the HMS logbook. In general, the Coastal Fisheries logbook is used by directed and incidental shark permit holders fishing with BLL and gillnet gear that may also be targeting or retaining reef fish or other coastal species. NMFS used this logbook for information regarding landings and effort for SCS and smooth dogfish. The HMS logbook is used by fishermen targeting tunas and swordfish with PLL gear. NMFS used this logbook primarily to get information regarding landings and effort for shortfin mako sharks. Fishermen report landings by species in both logbooks as well as discard information by species in the HMS logbook. Fishermen also record effort data and fishing location for each trip (in the Coastal Fisheries logbook) or set (in the HMS logbook). Logbooks are submitted to NMFS by individual fishermen and include effort data by permit type and gear type. Fishermen in the Northeast region who typically do not report in the Coastal Fisheries or HMS logbooks may also submit landings to the VTR program. NMFS used VTRs to determine the number of vessels and landings for species, such as smooth dogfish, that may not be reported in the Coastal Fisheries or HMS logbooks. NMFS used the MRFSS and LPS (Large Pelagic Survey) databases to get information on recreational landings of sharks.

NMFS also collects commercial data on shark landings and discards through the shark BLL, shark gillnet, and PLL observer programs. More detailed information on landings (*e.g.*, average size, weight, *etc.*) and discards is available through the observer reports than through the logbooks. In addition, through the observer program, NMFS gathers data on fishing trips that do not target sharks (*i.e.*, target other species such as the snapper-grouper complex or Spanish mackerel). However, observers are only present on a portion of the shark BLL, gillnet, and PLL fleets whereas the Coastal Fisheries and HMS logbooks contain data from the entire HMS fishing fleet with federal permits. Since only federally-permitted commercial shark fishermen are required to submit federal logbooks and are selected to carry observers, logbook data and observer program data do not encapsulate state landings or effort data and are not normally used for quota monitoring purposes.

NMFS uses federal and state dealer reports to monitor commercial shark landings for quota monitoring and stock assessment purposes. The dealer reports come from state shark dealers as well as from federal shark dealers through the state and federal quota monitoring system. Thus, commercial dealer reports include shark landings in both federal and state waters. NMFS then cross-checks these different sources to ensure double-reporting does not take place between federal and state dealers, and releases regular shark landings updates from these reports. NMFS also uses data submitted to the Gulf of Mexico commercial Fishery Information Network (GulfFIN) and commercial dealer data submitted to the ACCSP to quantify landings of species, such as smooth dogfish landings, in state and federal waters from Maine through Texas. In addition, the shark dealer reports are used to incorporate commercial fishery landings into stock assessments. However, shark dealer reports do not have detailed effort information that is included in logbook data, such as landings or trip data by different permit holders or gear type.

Because effort data is obtained through logbooks, while both state and federal landings are obtained through dealer reports, NMFS used a combination of both logbook and dealer reports to obtain the necessary information for analyses in this document. NMFS used logbook data to estimate effort in terms of number of trips taken by different permit and gear types in different regions and to quantify landings by permit and gear type in different regions. NMFS used landings data from shark dealer reports to determine historical landings of each shark species as well as baseline information under the different status quo, or No Action, alternatives.

### *Time series*

NMFS used a variety of data ranging from 2004 to 2008 from the Coastal Fisheries and HMS logbooks and shark dealer reports for SCS, data from 2004 – 2007 for shortfin mako sharks, and data from 1998-2007 from the ACCSP and GulfFIN programs for smooth dogfish to analyze the ecological, social, and economic impacts of the alternatives. NMFS chose these time series of data for a number of reasons. First, the latest shark stock assessments for the SCS complex, finetooth, Atlantic sharpnose, bonnethead, and blacknose sharks were conducted with data through 2005. Using landings data from 2004 – 2008 for SCS allowed NMFS to include the most recent data available for these species, and allowed for the consideration of recent trends in the alternatives considered for these species. For shortfin mako, the ICCAT shortfin mako shark stock assessment was conducted with data up through 2007. Using data from 2004 to 2007 allowed 2 years worth of data before and after the terminal year of the latest SCS assessment and encompassed the terminal year included in the shortfin mako assessment. Finally, NMFS used 10

years worth of data for smooth dogfish (1998 – 2007) to monitor the trends in smooth dogfish landings given this species has never been assessed.

NMFS estimated discards and bycatch in the commercial shark fishery based on data from the individual SCS stock assessments completed in 2007 and data from the BLL, gillnet, and PLL observer programs through 2008. In addition, NMFS used average 2004 – 2007 ex-vessel prices for economic analyses and 2009 permit information from NMFS' Southeast and Northeast Regional Offices for social analyses in this document. Based on these data, NMFS analyzed the ecological, social, and economic impacts associated with the different alternatives described below.

### *Analyses*

The National Environmental Policy Act (NEPA) requires federal agencies to consider the impacts of major federal actions on the human environment. The Council of Environmental Quality (CEQ) has defined “human environment” expansively to “include the natural and physical environment and the relationship of people with that environment” [40 CFR 1508.14]. Under National Standard 8 of the Magnuson-Stevens Act, “conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities” [301(a)(8)]. Thus, for each alternative outlined below, NMFS describes the ecological, economic, and social impacts associated with the alternative compared to the status quo or No Action alternative (considered the “baseline”). NMFS has also considered the cumulative impacts when added to other past, present, and reasonably foreseeable future actions at the end of this chapter per CEQ implementing regulations for NEPA (40 CFR 1508.7).

In general, an impact is a change from the status quo, which is also known as the No Action alternative in this chapter. An impact can be beneficial, which would benefit the stock, potentially increase revenues for fishermen, or improve fishing communities. An impact can also be characterized as adverse impact, which would be an impact detrimental to a stock, one that decreases revenues, or potentially has negative consequences for fishing communities. Finally, it could also be a neutral impact which would be no ecological, economical, or social change from the baseline or the No Action alternative. Ecological, economic, and social impacts for the different alternatives are described below. NMFS determined whether the ecological, economic, and social impacts would be adverse, beneficial, or neutral in the short- (*i.e.*, one to two years) and long-term (*i.e.*, longer than two years) by assessing the change anticipated to the stock, ex-vessel revenues, and potential number of permit holders and impacts to the fishing communities (*i.e.*, changes in fishing behavior, impacts on fish dealers, etc), by comparing each alternative to the No Action alternative or baseline. The specific time period depends on the alternative, for example when considering long-term impacts for the SCS alternatives, NMFS considered the long-term to be towards the end of the rebuilding time period. In addition, NMFS determined whether the impacts would be direct impacts, such as reducing the quota and therefore reducing the ex-vessel revenues to fishermen, or an indirect impact, such as reducing the amount of available shark product and indirectly affecting shark dealers and of a minor, moderate, significant, or significant but mitigated to be less than significant in magnitude.

The ecological impacts of the different alternatives are described below. There is also additional shark fishery information available in Chapter 3 that describes how the shark fisheries currently operate, including interactions with protected resources and associated bycatch in the different shark fisheries, including bycatch reduction and standardized reporting of bycatch, as required under National Standard 9 of the Magnuson-Stevens Act. Each alternative also considers potential changes in bycatch associated with each measure. Preferred alternatives were selected, in part, based on ways to reduce bycatch, to the extent practicable. In addition, economic impacts are described below for each alternative as well as in Chapters 6 (Economic Evaluation), 7 (Regulatory Impact Review), and 8 (Final Regulatory Flexibility Analysis). Finally, the social impact analysis is conducted below and describes the effects of social change for each alternative and according to NMFS' 01-111-02 "Guidelines for Assessment of the Social Impacts of Fishery Management Actions, Appendix 2(g) to NMFS Operational Guidelines – Fishery Management Process." The description of the social characteristics of the shark fisheries and communities can be found in Chapters 3 and 9 of this document as well as in Chapter 6 of the 2009 SAFE Report. The social overview or community profiles, which describe the present and historical social and economic context of the fishery, can be found in Chapter 9 of this document and in Chapter 6 of the 2009 SAFE Report. These various chapters and resources provide baseline data and analysis necessary for NMFS to meet its obligations to consider socioeconomic impacts under NEPA and to evaluate the potential adverse effects on and mitigation for participants in the fishery, including fishing communities, as required by the MSA paragraphs 301(a)(8) (National Standard 8), 16 U.S.C. §1851(a)(8) and 303(a)(9) (Fisheries Impact Statement), 16 U.S.C. §1853(a)(9). NMFS' compliance with the National Standards of the Magnuson-Stevens Act for the different preferred management measures are also outlined in Chapter 10 of this document.

## **4.1 Commercial Measures**

### **4.1.1 SCS Commercial Quotas**

All of the alternatives in this section pertain to the commercial portion of the Atlantic shark fishery. NMFS considered several alternatives relating to commercial quotas. The alternatives for the Atlantic shark commercial fishery range from maintaining the status quo under the No Action alternative, to restructuring the SCS quota, and closing the SCS fishery. The ecological, social, and economic impacts of each alternative are described below.

The 2007 blacknose shark stock assessment estimated that, consistent with the requirements of subsection 304(e) of the Magnuson-Stevens Act, blacknose sharks would have a 70 percent probability of rebuilding by 2027 with a TAC of 19,200 individuals per year. To achieve this TAC, NMFS would need to reduce overall blacknose mortality by at least 78 percent across all fisheries that interact with blacknose sharks. NMFS determined the number of blacknose sharks that could be taken in the Atlantic commercial shark fishery to achieve a 78 percent mortality reduction. The result is a commercial allowance of 7,094 blacknose sharks that could be taken (landed and discarded) within the Atlantic commercial shark fishery while still allowing the blacknose sharks to rebuild as outlined in Chapter 1. The specific analyses used to calculate the quotas described in each of the following alternatives are described in Appendix A.

NMFS is also working with the GMFMC and SAFMC to reduce blacknose shark discards in the shrimp trawl fisheries in addition to the management measures analyzed in this document (see Appendix E). The alternatives considered below assume for purposes of analysis, that bycatch of blacknose sharks in shrimp trawl fisheries is being reduced via Council action. NMFS will monitor bycatch in the shrimp trawl fisheries and supplement this document and take appropriate action if the foregoing reductions do not occur and the limited reduction may result in a meaningful environmental impact.

As described in Chapter 2, the alternatives considered for commercial quotas are:

Alternative A1	No Action. Maintain the existing SCS quota and species complex
Alternative A2	Establish a new SCS quota of 221.6 mt dw and a blacknose quota of 12.1 mt dw
Alternative A3	Establish a new SCS quota of 110.8 mt dw and a blacknose quota of 19.9 mt dw; allow all current authorized gears for sharks
Alternative A4	Establish a new SCS quota of 55.4 mt dw and a blacknose quota of 15.9 mt dw; remove shark gillnet gear as an authorized gear for sharks
Alternative A5	Close the SCS fishery
Alternative A6	<i>Establish a new SCS quota of 221.6 mt dw and a blacknose quota of 19.9 mt dw, allow all current authorized gears for sharks – Preferred Alternative</i>

### *Ecological Impacts*

Under alternative A1, the No Action alternative, NMFS would keep blacknose sharks within the SCS quota and maintain the annual SCS quota of 454 mt dw. NMFS would also maintain the current SCS complex (finetooth, Atlantic sharpnose, bonnethead, and blacknose sharks). This quota would apply to one overall region. Under this alternative, and all other alternatives considered, NMFS would maintain the current regulations regarding overharvests where overharvests of quota for each species/complex would be removed from the next fishing year. The carryover of underharvests for species that are not overfished or are not experiencing overfishing would be added to the base quota the following year and capped at 50 percent of the base quota. However, there would be no carryover of underharvests for species that are unknown, overfished, or experiencing overfishing. In addition, NMFS would close each species/complex with five days notice upon filing in the Federal Register when 80 percent of a given quota is filled or projected to be filled. In addition, under the No Action alternative, A1, NMFS would continue to allow blacknose sharks to be taken under EFPs, SRPs, Display Permits, and LOAs. On average, 54 blacknose sharks are taken (*i.e.*, kept or discarded dead) under the exempted fishing program. Given the average weight of the blacknose sharks taken under the exempted fishing program is 3.3 lb dw, this equals approximately 178.2 lb dw of blacknose sharks taken under this program each year. This level of mortality would continue under alternative A1.

Without reductions in current blacknose shark mortality, NMFS would not be able to achieve the TAC of 19,200 blacknose sharks per year recommended by the 2007 blacknose shark stock assessment. To achieve this TAC, NMFS would need to reduce overall blacknose mortality by at least 78 percent in each sector which captures blacknose sharks. The average

annual landings of blacknose sharks in the Atlantic shark commercial fishery was 27,484 blacknose sharks from 1999 – 2005 (136,595 lb dw), and the average annual discards were 5,007 blacknose sharks over that same time period (Table 4.1). A 78-percent reduction in blacknose shark landings (6,046 blacknose sharks/year) and discards (1,102 blacknose sharks/year) in the Atlantic shark commercial fishery would be a total of 7,148 blacknose sharks per year (6,046 + 1,102 = 7,148). However, blacknose sharks are also taken in the exempted fishing program. Therefore, to determine the commercial allowance for the Atlantic shark commercial fishery, NMFS subtracted the amount of blacknose sharks that are caught in the exempted fishing program. On average, 54 blacknose sharks are taken (*i.e.*, kept or discarded dead) under the exempted fishing program. Thus, the commercial allowance available to Atlantic shark commercial fishermen would be 7,094 blacknose sharks (7,148 blacknose sharks – 54 blacknose sharks taken in the EFP program = 7,094 blacknose sharks).

Alternative A1 would have direct minor, adverse ecological impacts in the short-term since there would be no change to the Atlantic shark fisheries, but could result in direct significantly adverse long-term ecological impacts for SCS, since this alternative would result in continued overfishing of blacknose sharks, which would lead to further stock decline of this species, and could increase fishing pressure on the other SCS species as fishermen shift their efforts to other species to make up for the reduced blacknose catch. Since this measure would leave the fishery unchanged there would be indirect neutral ecological impacts in the short-term, but may result in moderate, adverse indirect impacts over time due to the increasing decline of the blacknose shark population. Due to the combined effects of the No Action alternative there would likely be an adverse cumulative ecological impact, but the impact should be minor. Alternative A1 does not achieve the necessary reduction in the Atlantic shark commercial fishery, blacknose sharks would not be able to rebuild within their specified rebuilding timeframe (see Chapter 1). Therefore, NMFS does not prefer this alternative at this time.

**Table 4.1 Sources of blacknose shark mortality, 1999-2005.**

Source: NMFS, 2007. Estimates from the ‘longline’, ‘nets’, and ‘lines’ columns are derived from data reported in the Northeast and Southeast General Canvass data systems. Longline discards are derived from multiplying the longline landings by the ratio of dead discards observed in the commercial shark bottom longline fishery. The numbers in the shrimp bycatch columns are derived using a Bayesian model (Nichols, 2007).

<b>Gear</b>	<b>Shark Longline</b>	<b>Shark Nets</b>	<b>Shark Lines</b>	<b>Shark Longline Discards</b>	<b>GOM Shrimp bycatch</b>	<b>SA Shrimp bycatch</b>	<b>Recreational Landings</b>	<b>Total</b>
<b>Number of fish</b>	8,091	19,041	352	5,007	38,626	4,856	10,408	86,381
<b>Percent by number</b>	9%	22%	<1%	6%	45%	6%	12%	100%
<b>Weight (lb dw)</b>	40,212	94,634	1,749	24,885	191,971	24,134	15,612	393,198
<b>Weight (mt dw)</b>	18	43	1	11	87	11	7	178
<b>Percent by weight</b>	10%	24%	<1%	6%	49%	6%	4%	100%

In the DEIS, alternative A2 removed blacknose sharks from the SCS quota and created a blacknose shark-specific quota and a separate non-blacknose SCS quota. The non-blacknose SCS quota applied to finetooth, Atlantic sharpnose, and bonnethead sharks. The current SCS quota is 454 mt dw, and the average landings of blacknose sharks from 2004 – 2007 was 61.5 mt dw. Under this alternative in the DEIS, NMFS subtracted the average landings of blacknose sharks from the SCS quota to establish a new non-blacknose SCS quota of 392.5 mt dw ( $454 - 61.5 = 392.5$ ). NMFS then reduced the average landings of blacknose sharks by 78 percent to establish a blacknose quota of 13.5 mt dw ( $61.5 * .78 = 47.97 - 61.5 = 13.5$ ). This blacknose shark quota was equal to 2,834 blacknose sharks per year, which was calculated using an average weight of 10.5 lb dw per shark for the combined BLL and gillnet fisheries, using an average weight for blacknose caught in the gillnet fisheries of 14.4 lb dw.

In the FEIS, based in part on updated data (see Appendix A), NMFS revised the quotas in alternative A2. The revised alternative A2 would still establish a non-blacknose SCS quota for finetooth, Atlantic sharpnose, and bonnethead sharks. However, rather than subtracting the average blacknose shark landings from the SCS quota, as proposed in the DEIS, the revised non-blacknose SCS quota would be based on the average landings of finetooth, Atlantic sharpnose, and bonnethead sharks from 2004 – 2008, which is 221.6 mt dw. This change in approach is due, in part, to be consistent with the 2007 SCS stock assessment that indicated that, while none of those three species are currently overfished, or undergoing overfishing, fishing mortality should not be increased.

With regards to blacknose sharks, the quota under alternative A2 in the DEIS was based on average landings from 2004 – 2007. The revised blacknose quota was calculated as it was in the DEIS but is based on the average landings of blacknose sharks of 55 mt dw from 2004 – 2008. Therefore, the revised blacknose quota under alternative A2 would be a 78 percent reduction of 55 mt dw, or 12.1 mt dw ( $55 * .78 = 42.9 - 55 = 12.1$ ). Revised data from the SEFSC indicates that the average shark weight for blacknose sharks caught in the gillnet fishery is actually larger than what was used in the DEIS, or 18.7 lb dw. Using this average weight, and the weighted average for blacknose shark caught by each gear type (number of trips for a specific gear / total trips from all gears), a new average weight for blacknose sharks in the combined BLL and gillnets fisheries was set at 6.4 lb dw. Using this new combined average weight, the blacknose quota of 12.1 mt dw is equal to 4,271 blacknose sharks available for the commercial shark fisheries. Regulations regarding over- and underharvest quota adjustments and closing a species/complex when 80 percent of a given quota is filled would not change under this alternative. In addition, blacknose sharks would continue to be taken under the exempted fishing program as they currently are under the No Action alternative, A1.

Under various scenarios that included/excluded certain gears, and different retention limits, only those scenarios that included gillnet gear as an authorized fishing method were able to reduce landings of blacknose sharks below the commercial allowance of 7,094. For those scenarios that excluded gillnets, or prohibited retention of blacknose sharks, the overall mortality of blacknose sharks exceeded the commercial allowance of 7,094 because of the discards from directed fishing on non-blacknose SCS (see Appendix A). For those scenarios that would retain gillnet gear as an authorized gear, the projected landings would meet the goal of reducing the blacknose shark mortality in terms of numbers of sharks, but would exceed the blacknose quota of 12.1 mt dw.

Since Alternative A2 would base the quota for SCS on the 2004 – 2008 average landings, there would be neutral ecological impacts to the SCS species and, there would be no direct, or indirect, adverse ecological impacts in the short-term from this SCS quota. With the reduced blacknose quota to 12.1 mt dw, alternative A2 would lead to the rebuilding of this stock, and even with the high rate of discards of blacknose sharks that would be seen under some of the various scenarios (see Appendix A), there would be a direct, significant and beneficial, long-term ecological impact for the blacknose stocks as the stock would rebuild at a rate faster than under the No Action alternative. With a rebuilding blacknose shark stock, and no increase in pressure on the other SCS shark stocks due to the quotas recommended in alternative A2, the indirect ecological impact of this action would be moderate and beneficial in the long-term. There would be a direct, adverse socio-economic impact on fishermen in the short-term from alternative A2, due to the decreased blacknose shark quota, but the impact would be minor in the long-term as fishermen would adapt to the new regulations and the reduced quota would lead to additional availability of blacknose sharks. Since blacknose sharks make up a relatively small portion of shark product, the socio-economic impacts of alternative A2 would be indirect, minor, adverse in the short-term, but neutral over the long-term as businesses and communities would find other sources of revenue. Because of the benefits to the stocks, and due to the loss of revenue for fishermen at least in the short-term, the cumulative impacts from alternative A2 would be minor, and ecologically beneficial, but socio-economically adverse. Since there would likely be reduced fishing effort because of the reduced quotas, there would be a potential benefit for protected resources from alternative A2 compared to the No Action alternative, but the impacts would likely be minor both in the long-term and cumulatively.

In the DEIS, alternative A3 removed blacknose sharks from the SCS quota and created a blacknose shark-specific quota and a separate non-blacknose SCS quota. In the DEIS, the non-blacknose SCS proposed quota was 42.7 mt dw, an 82 percent reduction from the average landings of finetooth, Atlantic sharpnose, and bonnethead sharks from 2004 – 2007 (Table 4.2). The blacknose shark quota would have been set at 16.6 mt dw, which was the amount of blacknose sharks that would be harvested while the non-blacknose SCS quota was harvested. In addition, fishermen with an incidental LAP would have been prohibited from retaining blacknose sharks.

In the FEIS, the average landings and mortality rates of blacknose sharks (see Appendix A) were revised based on updated landings and size data from the SEFSC and consideration of public comments on the DEIS. These changes resulted in revised quotas under alternative A3. The analyses used to calculate the revised quotas were essentially the same as those used in the DEIS. The changes are mainly due to revised average weight data, particularly for the gillnet fishery, and through public comment that resulted in analyses indicating that gillnet fishermen appear to be able to target and avoid certain species of sharks. Therefore, the revised alternative A3 for the FEIS would set the non-blacknose SCS quota at 110.8 mt dw, which is a 50 percent reduction of the average landings for these species from 2004 – 2008. The revised blacknose shark quota would be 19.9 mt dw, which is the amount of blacknose sharks that would be harvested while the non-blacknose SCS quota is harvested, and is a 64 percent reduction compared to the average landings of blacknose sharks of 55 mt dw from 2004 through 2008. Alternative A3 in the FEIS would also allow fishermen with incidental permits to retain blacknose sharks when the fishing season is open.

**Table 4.2**

**Average commercial landings of SCS from 2004-2008 in mt dw (lb dw).**

SCS	2004	2005	2006	2007	2008
Bonnethead	13 (29,402)	15 (33,408)	15 (33,911)	24 (53,638)	28 (60,970)
Finetooth	55 (121,036)	50 (109,774)	37 (80,536)	63 (138,542)	37 (80,833)
Atlantic sharpnose	105 (230,880)	161 (354,225)	208 (459,184)	151 (332,160)	147 (324,622)
Blacknose	31 (68,108)	56 (124,039)	85 (187,907)	41 (91,438)	61 (134,255)

Alternative A3 assumes that fishermen with a directed shark permit would fish for SCS in a directed fashion, and that incidental shark permit fishermen would retain blacknose sharks, until the non-blacknose SCS and/or blacknose shark quota reached 80 percent. At that time, both the non-blacknose SCS fishery and the blacknose shark fishery would close, fishermen would fish for other fish species, and all SCS, including blacknose sharks, would have to be discarded. NMFS anticipates that some of the displaced SCS fishing effort may be redistributed to other gillnet and BLL fisheries once the non-blacknose SCS and blacknose fisheries close.

As shown in Chapter 3 (Table 3.26), many shark fishermen hold permits in other BLL and gillnet fisheries. Redistributed effort to these other fisheries could have indirect adverse ecological impacts, however since most of those fisheries are limited access and have fishing restrictions in place to prevent overfishing, NMFS feels any adverse ecological impacts due to redistributed effort would likely be minor. The beneficial ecological impacts from increased stocks of all SCS species would likely be minor in the short-term, but moderate beneficial indirect ecological impacts are anticipated in the long-term as the overall ecosystem would become healthier due to increases in the SCS stocks.

In terms of direct ecological impacts, alternative A3 would likely have neutral impacts in the short-term, but could result in significant long-term, beneficial impacts for blacknose, Atlantic sharpnose, bonnethead, and finetooth sharks, as it would reduce landings by 64 percent for blacknose sharks and 50 percent for non-blacknose SCS based on average landings from 2004 – 2008 (Table 4.3). In addition, alternative A3 would reduce blacknose shark discards by 94 percent compared to the No Action alternative. However, since non-blacknose SCS are caught more often in the SCS fishery, as well as other fisheries (for instance, on average, incidental fisheries catch approximately one blacknose shark per trip whereas the same trips, on average, catch 40 non-blacknose SCS per trip), discards of non-blacknose SCS could increase by up to 67 percent based on current discard rates and assuming past fishing effort continues after the implementation of these management measures (Table 4.3).

Because of the smaller proposed non-blacknose SCS quota, which would result in reduced effort in the fishery and a corresponding reduction in the blacknose shark discards, the cumulative ecological impacts would be moderate and beneficial compared to the No Action alternative. This reduced fishing effort would likely have direct, and indirect, beneficial impacts for protected resources, which would likely be minor in the short-term, but would potentially be moderate in the long-term. Despite these benefits, the likelihood for a large increase in non-

blacknose SCS discards and because of the possible adverse socio-economic impacts of the non-blacknose SCS quota to be described later, NMFS does not prefer this alternative at this time.

**Table 4.3** Estimated landings and discards of blacknose sharks and non-blacknose SCS under alternative A3

Species	Estimated Landings (mt dw)	Percent Change in Landings Compared to No Action	Estimated Discards (mt dw)	Percent Change in Discards Compared to No Action
<i>Blacknose</i>				
Under No Action Alternative	55	0%	12.3	0%
Under Alternative A3	19.9	64%↓	0.74	94%↓
<i>Non-Blacknose SCS</i>				
Under No Action Alternative	221.6	0%	19.6	0%
Under Alternative A3	110.8	50%↓	32.8	67%↑

Alternative A4, the preferred alternative in the DEIS, removed blacknose sharks from the SCS quota and created a blacknose shark-specific quota and a separate non-blacknose SCS quota. In the DEIS, alternative A4 proposed a non-blacknose SCS quota of 56.9 mt dw. This quota was a 76 percent reduction from the average landings of finetooth, Atlantic sharpnose, and bonnethead sharks from 2004 through 2007. Also, NMFS would have established a blacknose-specific quota of 14.9 mt dw, which was the amount of blacknose sharks that would have been harvested while the non-blacknose SCS quota was harvested. Under alternative A4 in the DEIS, gillnet gear would have been prohibited and fishermen with incidental LAPs would have not been authorized to retain blacknose sharks.

Based on public comment, which led to analysis of gillnet observer data that indicates that gillnet fishermen are able to target certain shark species, and avoid others; and due to NMFS' analysis of updated data which shows that blacknose shark mortality rates are lower than those used in the DEIS, alternative A4 has been revised and is no longer the preferred alternative for the FEIS. The revised quota under alternative A4 would establish the non-blacknose SCS quota at 55.4 mt dw, which is a 75 percent reduction from the current, average landings of finetooth, Atlantic sharpnose, and bonnethead sharks from 2004 through 2008. A separate blacknose-specific quota would be set at 15.9 mt dw, which is the amount of blacknose sharks that would be harvested while the non-blacknose SCS quota of 55.4 mt dw is harvested. Gillnets would still be prohibited as an authorized gear in the SCS fishery under alternative A4 in the FEIS. Also, fishermen with an incidental LAP would not be authorized to retain any blacknose sharks.

This alternative assumes that gillnet gear would not be used to harvest sharks under alternatives B2 or B3, and fishermen would fish for SCS with other authorized gears in a directed fashion until the non-blacknose SCS and/or blacknose shark quota reached 80 percent (see Appendix A). At that time, both the non-blacknose SCS fishery and the blacknose shark

fishery would close, fishermen would fish for other species, and all SCS, including blacknose sharks, would have to be discarded. NMFS anticipates some of the displaced SCS fishing effort may be redistributed to other gillnet and BLL fisheries once the non-blacknose and blacknose fisheries close. As mentioned above, many shark fishermen hold permits in other BLL and gillnet fisheries. Redistributed effort to these other fisheries could result in indirect adverse ecological impacts in those fisheries.

Alternative A4 would reduce landings of non-blacknose SCS by 76 percent relative to average landings from 2004 through 2008, if implemented with either alternative B2 or B3, when compared to the No Action alternative. Blacknose shark landings would decrease by 72 percent relative to average landings from 2004 through 2008 if implemented with alternative B2 and by 73 percent if implemented with alternative B3 (Table 4.4). Under alternative A4, discards of non-blacknose SCS would only decrease by 3 percent if gillnets were prohibited in the entire Atlantic (alternative B2) and would decrease by only 4 percent if gillnets were prohibited from South Carolina south (alternative B3). Blacknose shark discards would decrease by 99 percent if put in place along with alternative B2 or B3 (Table 4.4), compared to the No Action alternative. NMFS assumes that if retention of sharks is prohibited with gillnet gear, directed gillnet fishing for sharks would cease. Fishermen would continue to use gillnet gear to target other fish species, and discard any sharks that were incidentally caught.

Because the direct benefits from the reduced landings of blacknose and non-blacknose SCS considered in alternative A4 would take time to be realized, there would be minor direct beneficial ecological impacts in the short-term, but as the blacknose shark stock rebuilds, there is the potential for significantly beneficial direct ecological impacts in the long-term. The indirect benefits from alternative A4 are also likely to be beneficial, but minor in the short-term. However, the impact from healthier shark stocks should increase to moderately beneficial in the long term as a more natural interspecies relationship is established. The overall cumulative ecological impact from alternative A4 would potentially be moderately beneficial.

Although the interactions between gillnets and protected resources are minimal (see Chapter 3), the combined reduction in fishing effort, and removal of gillnets as an authorized gear in the SCS shark fishery, is likely to have both direct, and indirect, beneficial impacts on protected resources. These impacts would be minor in the short-term, but would likely become moderate in the long-term, due to the large reduction in fishing effort from the quota and gear restrictions under alternative A4 (when combined with B2 or B3) when compared to the No Action alternative.

A review of the most recent shark gillnet observer data showed that gillnet fishermen may be able to target and avoid certain shark species when fishing. Also, the same data showed that the blacknose sharks caught in other gears used in the fishery, such as BLL, tend to be smaller in size than those caught in gillnet gear. If gillnet gear is prohibited under alternative A4, it is likely that most directed and incidental fishermen that currently use gillnet gear would switch to other gears, which might lead to an increase in the landings of juvenile blacknose sharks. Although this alternative would reduce mortality of all SCS species, and likely have a minor beneficial impact on protected resources, because mortality of juvenile blacknose sharks could increase under alternative A4 and because of the socio-economic impacts described later, NMFS does not prefer this alternative at this time.

**Table 4.4 Estimated landings and discards of blacknose sharks and non-blacknose SCS under alternative A4**

Species	Estimated Landings ( mt dw)	Percent Change in Landings Compared to No Action Alternative	Estimated Discards (mt dw)	Percent Change in Discards Compared to No Action Alternative
<i>Blacknose</i>				
Under No Action Alternative	55	0%	12.3	0%
Gillnets prohibited in all Atlantic (B2)	15.9	72%↓	.13†	99%↓
Gillnets prohibited South Carolina south (B3)	15.7	73%↓	.13†	99%↓
<i>Non-Blacknose SCS</i>				
Under No Action Alternative	221.6	0%	19.6	0%
Gillnets prohibited in all Atlantic (B2)	53.2	76%↓	19†	3%↓
Gillnets prohibited South Carolina south (B3)	53	76%↓	19†	4%↓

†all blacknose and non-blacknose SCS discards are estimated to come from BLL gear

Alternative A5 would close the entire SCS commercial shark fishery, prohibiting the landing of any SCS, including blacknose sharks. Average landings from 2004-2008 of finetooth, Atlantic sharpnose, bonnethead, and blacknose sharks were 48.1 mt dw, 154.3 mt dw, 19.2 mt dw, and 55 mt dw, respectively. However, since shark fishermen would presumably continue to fish for LCS using BLL gear, discards of SCS would continue on BLL gear. Based on the latest SCS stock assessments, discards for finetooth, Atlantic sharpnose, bonnethead, and blacknose sharks on BLL gear were 0 mt dw, 18 mt dw, 1.6 mt dw, and 12.3 mt dw, respectively (NMFS, 2007).

Since gillnets are the primary gear used to target SCS except for strikenets, which are used to target blacktip sharks, presumably all directed shark gillnet fishing, with the exception of strikenets, would stop under alternative A5. If all directed shark gillnet fishing stopped under alternative A5, NMFS estimates that landings of LCS could decrease by approximately 46.3 mt dw (3 percent) compared to current average landings of 1,438 mt dw from 2004 through 2007; however, this decrease may be slightly less if blacktip sharks continue to be harvested with directed strikenet gear. Alternative A5 could also decrease LCS dead discards in gillnets by 24 mt dw, or 15 percent, compared to average annual discards of 162.9 mt dw from 2003 through 2005.

The direct ecological impacts from alternative A5 could be moderately beneficial in the short-term, and have the potential to become significant and beneficial in the long-term for all SCS species, as it would reduce landings of finetooth, Atlantic sharpnose, bonnethead, and blacknose sharks. Potential indirect ecological benefits could also apply to reduced dead discards in the LCS fisheries, and due to the possibility for enrichment of the ecosystem as a whole, through healthier stocks in both the SCS and LCS fisheries. These indirect impacts would be beneficial, and likely be moderate in the short-term, but significant in the long-term. Again, due to the reduced fishing effort, there would likely be a beneficial impact on protected resources, with those benefits being minor in the short-term, but potentially moderate in the long-term.

While this alternative could reduce blacknose shark mortality, it would also severely curtail the fishery for all SCS landings. Not only would the socio-economic impact (described below) on the directed and incidental shark permit holders be significant, alternative A5 would also severely curtail data collection on SCS that could be used for future stock assessments. For these reasons, NMFS does not prefer this alternative at this time.

Alternative A6, the preferred alternative in this FEIS, is a composite alternative combining elements of alternatives A2 and A3. The new preferred alternative followed logically from data from the SEFSC and comments from the public, which resulted in a re-evaluation of the proposed changes to the SCS fishery to protect blacknose sharks. NMFS believes that this new preferred alternative better reflects the intent of the previous preferred alternative, and remains a reasonable alternative capable of meeting the purpose and need of the action. It does not alter in any material manner management approaches fully analyzed in the DEIS. Alternative A6 would establish a new non-blacknose SCS quota of 212.6 mt dw, which would be equal to the average annual landings for the non-blacknose SCS fishery from 2004 through 2008, and an individual blacknose shark quota of 19.9 mt dw (43,872 lb dw), which would be a 64 percent reduction in blacknose shark landings relative to average landings from 2004 – 2008 of 55 mt dw (Table 4.5).

Based on public comments and recent analysis of the 2005 – 2008 Shark Gillnet Observer Data, NMFS found that gillnet fishermen seem to be able to selectively target different shark species with gillnet gear, and have been able to minimize the mortality of blacknose sharks (as well as protected species) in gillnets. The data appears to indicate that elimination of gillnets as an authorized gear in the Atlantic shark fishery would not achieve the conservation and management objective necessary to rebuilding the blacknose shark, and may in fact be detrimental to blacknose shark stock due to higher discard rates of blacknose sharks from other gears used in the fishery. Therefore, contrary to the DEIS, NMFS would not prohibit gillnets as an authorized gear for sharks under alternative A6 and would continue to allow retention of blacknose sharks by incidental permit holders.

Under alternative A6, if either the non-blacknose SCS quota (212.6 mt dw) or blacknose shark quota (19.9 mt dw) reaches 80 percent, NMFS would close both fisheries for the rest of the season. If a future stock assessment determined that blacknose sharks continued to be overfished or that overfishing was still occurring, NMFS would make regulatory changes as needed in upcoming framework actions. These changes could include, but are not limited to, reducing the blacknose shark and/or the non-blacknose SCS quotas.

The direct ecological impacts from alternative A6 would be neutral in the short-term, as the SCS fishery would be prosecuted in a similar fashion as in recent years; but the direct ecological impacts could be significantly beneficial in the long-term, due to the blacknose shark specific quota, which would reduce blacknose shark landings and mortalities to levels that would allow for rebuilding of the stock consistent with the National Standard 1 of the Magnuson-Stevens Act. The indirect ecological impacts from alternative A6 would come from the benefits of a healthier ecosystem through improved stocks. These benefits would take time, so there

would be minor beneficial indirect impacts in the near-term, but have the potential for moderate beneficial indirect impacts over time.

With minimal reduction in fishing effort (mostly through the blacknose shark quota), alternative A6 would likely only have minor, long-term direct, and indirect, benefits for protected resources. But, as previously mentioned, since the impact on protected resources is minor in the gillnet fishery, the cumulative impact would be slightly more beneficial than the No Action alternative.

**Table 4.5** Estimated landings and discards of blacknose sharks and non-blacknose SCS under Alternative A6.

Species	Estimated Landings (mt dw)	Percent Change in Landings Compared to No Action Alternative	Estimated Discards (mt dw)	Percent Change in Discards Compared to No Action Alternative
<i>Blacknose</i>				
Under No Action Alternative	55	0%	12.3	0%
Under Alternative 6	19.9	64%↓	0.74	94%↓
<i>Non-Blacknose SCS</i>				
Under No Action Alternative	221.6	0%	19.6	0%
Under Alternative 6	221.6	0%	19.6	0%

*Social and Economic Impacts*

Under the No Action alternative, A1, the average annual gross revenues from SCS landings, including blacknose shark landings, would remain unchanged, at least in the short-term, as the quotas would remain the same. The average annual gross revenues from 2004 through 2007 from SCS landings were \$830,918. Fishermen would be expected to fish in a similar manner, and dealers, and other entities that are impacted by the fisheries, would experience neutral economic impacts in the short-term. However, in the long term, a decrease in revenues may be expected as the blacknose shark stock continues to decline, which could result in adverse economic impacts. The results would likely be minor in the long-term in a direct and indirect manner as fishermen would have to move over to other fisheries to make up for lost revenues, which might require purchasing of additional gear; and other entities that have business tied to the shark industry would have to diversify in order to make-up for lost revenue. The cumulative impact of the No Action alternative would be adverse, but minor, as the impacts would occur over time, and it is expected the affected industries would adapt over time.

Under revised alternative A2, NMFS would remove blacknose sharks from the SCS quota and create a blacknose shark-specific quota of 12.1 mt dw and a separate non-blacknose SCS quota, which would apply to finetooth, Atlantic sharpnose, and bonnethead sharks, of 221.6 mt dw. NMFS anticipates that non-blacknose SCS landings would not decrease as the non-

blacknose SCS quota would only be reduced to equal the average blacknose shark landings from 2004 – 2008. However, the blacknose shark quota would be reduced by 78 percent based on average landings from 2004 through 2008. Average annual gross revenues for the blacknose shark landings for the entire fishery would decrease from \$172,110 under the No Action alternative down to \$33,611 under alternative A2. As directed shark permit holders had the majority of blacknose shark landings under the No Action alternative, NMFS anticipates that directed shark permit holders would experience the largest impacts under alternative A2. The decrease in average annual gross revenues for directed and incidental shark permit holders would depend on the specific trip limits associated with the blacknose shark quota established under A2 (see Appendix A). Because discards would continue as fishermen directed on non-blacknose SCS, regardless of the retention limits, overall mortality for blacknose sharks would still be above the commercial allowance of 7,094 blacknose sharks/year, even if the retention of blacknose sharks is prohibited (see Appendix A).

Under alternative A2, it is anticipated that there would be direct adverse socio-economic impacts in the short-, and long-term, from the new quotas proposed. In the short-term lost revenues would be moderate for the 68 directed shark permit and 29 incidental shark permit holders that land non-blacknose SCS, and the 44 directed shark and the 7 incidental shark permits that land blacknose shark. Over the long-term the economic impact would be minor, as the fishermen are likely to adapt to the new regulations by fishing in other fisheries, or change their fishing habitats. The indirect socio-economic impacts from alternative A2 would be adverse, but minor in the short-term, as the anticipated reduction in blacknose landings would result in a corresponding loss of revenue for a small number of businesses as blacknose shark product does not make up a large part of the market. In the long-term these indirect impacts would be neutral as businesses would be expected to find other sources of revenue to augment the losses from the lower quota. Because the economic impacts of alternative A2 would be felt in the short-term, but lessened over time, it is anticipated that the cumulative impact would be adverse, but minor.

Under the revised alternative A3, NMFS would remove blacknose sharks from the SCS quota and create a blacknose shark-specific quota of 19.9 mt dw (43,872 lb dw) and a separate non-blacknose SCS quota of 110.8 mt dw (244,270 lb dw), which would apply to finetooth, Atlantic sharpnose, and bonnethead sharks. Under alternative A3, average annual gross revenues for non-blacknose SCS landings for the entire fishery are anticipated to be \$310,222, which is a loss of \$275,103 compared to the No Action alternative A1. Directed shark permit holders would experience significantly larger direct adverse social and economic impacts compared to incidental shark permit holders who do not rely on shark landings for revenues as much as directed shark permit holders. The blacknose shark quota would be reduced by 64 percent to 19.9 mt dw, based on the average landings from 2004 through 2008. Under this alternative, average annual gross revenues for the blacknose shark landings for directed shark permit holders would decrease by an estimated \$108,654 or a 68 percent reduction in average annual gross revenues compared to the No Action alternative. For incidental shark permit holders, the reduction in blacknose sharks landings would result in a loss of \$8,179 from the annual average of \$12,048.

NMFS anticipates that the 68 directed shark permit holders and 29 incidental shark permit holders that had non-blacknose SCS landings would experience moderate short-term, and

potentially significant long-term, adverse socio-economic impacts from the reduced non-blacknose SCS quota. These fishermen would most likely have to fish in other fisheries, which may require purchasing new gear or modifying current gears, to make up for lost revenues, or leaving the fishery altogether. At the same time, the 44 directed shark permit holders and the 7 incidental shark permit holders that land blacknose shark would experience moderate, short-term and long-term, adverse social and economic impacts from the new blacknose shark quota. The indirect impacts from the proposed quotas in alternative A3 would be moderate in the short-term, but could be reduced to a minor impact in the long-term, as both the fishing industry and ancillary industries adapt to the regulations by finding other sources of revenue. Due to the potential for lost revenue, and possible need for capital expenditures among a small group in the fishing industry, and the need for many businesses to shift away from shark-related products, the cumulative impact from alternative A3 would be moderately adverse. Given the scope of the economic impacts due to the reduced quotas under alternative A3, and how the losses in revenue would impact individuals and communities, NMFS does not prefer this alternative at this time.

Under the alternative A4 presented in this FEIS, NMFS would remove blacknose sharks from the SCS quota and create a blacknose shark-specific quota (15.9 mt dw) and a separate non-blacknose SCS quota equal to 55.4 mt dw, which would apply to finetooth, Atlantic sharpnose, and bonnethead sharks. In addition, fishermen with incidental shark permits would not be authorized to retain any blacknose sharks, and gillnet gear would be removed as an authorized gear type in the Atlantic shark fishery. The non-blacknose SCS quota would be a 75 percent reduction of the average landings from 2004 through 2008. NMFS determined that by reducing the overall SCS fishery, the level of blacknose shark discards would be such that the total blacknose mortality would stay below the commercial allowance (see Appendix A). The blacknose-specific quota would be set at 15.9 mt dw under the revised alternative A4, which is the amount of blacknose sharks that would be harvested while the non-blacknose SCS quota is harvested (see Appendix A). This alternative assumes that fishermen with directed shark permits would fish for SCS in a directed fashion until the non-blacknose SCS and/or the blacknose quota reached 80 percent. This alternative assumes that gillnet gear would not be used to harvest sharks as explained in alternatives B2 and B3.

Given the significant reduction in the non-blacknose SCS quota, NMFS anticipates that the 41 directed shark permit holders and 22 incidental shark permit holders that did not use gillnet gear to land non-blacknose SCS could experience moderate short-term, and significant long-term, adverse socio-economic impacts from the non-blacknose SCS quota due to a direct loss in revenue. Under the non-blacknose SCS quota of 55.4 mt dw, average annual gross revenues for non-blacknose SCS landings for the entire fishery are anticipated to be \$155,111, a 77 percent reduction in average annual gross revenues compared to the average annual gross revenues expected under the No Action alternative A1. These fishermen may be required to fish in other fisheries to make up for lost revenues due to reductions in non-blacknose SCS landings, may have to purchase new gear to work in these fisheries, or may be forced to leave the fishery altogether. The reduction in non-blacknose SCS quota may have indirect impacts on dealers and seafood processors, as these businesses would need to diversify to make up for lost revenues, or may need to find other ways to cut costs to offset the decline in revenues. These impacts would be moderate in the short-term, but would become minor in long-term as these businesses modify their business practices to accommodate the new regulations.

Under alternative A4, the blacknose shark quota would be reduced by 72 percent based on average landings from 2004 through 2008. Thus, the 15 directed shark permit holders and 5 incidental shark permit holders that did not use gillnet gear to land blacknose sharks would experience minor short- and long-term direct adverse social and economic impacts from the reduced blacknose shark quota as they would most likely have to fish in other fisheries to make up for lost blacknose landings, or leave the fishery altogether. The reduced blacknose quota would result in an estimated loss of \$115,895 in annual gross revenues. For incidental shark permit holders the 72 percent reduction in blacknose shark landings would result in a loss of income of \$8,958 from the annual average revenues of \$12,048 under the No Action alternative. These lost revenues could translate into moderate short-term, but minor long-term, direct adverse social and economic impacts as fishermen with incidental shark permits would need to change fishing practices, but do not rely on limited shark catch as a major source of revenue. Other stake holders, such as dealers and seafood processors, could experience moderate, short-term and long-term indirect adverse social impacts as they would also have to change their business practices to make up for lost revenue from blacknose shark products.

Alternative A4 would also prohibit the use of gillnets to land sharks as described under alternatives B2 and B3. Alternative B2 would prohibit the landings of sharks with gillnet gear in the Atlantic, Gulf of Mexico, and Caribbean Sea. Therefore, approximately 27 directed shark permit holders and 7 incidental shark permit holders that used gillnet gear to land non-blacknose SCS, and approximately 15 directed shark permit holders and 2 incidental shark permit holders that used gillnet gear to land blacknose sharks would experience additional losses under alternatives A4 and B2. Shark fishermen with directed shark permits that use gillnets would presumably leave the shark gillnet fishery and would experience direct significant, adverse social and economic impacts as they would have to change their fishing practices, which may require purchasing different gear to work in other fisheries. Fishermen with incidental shark permits would most likely experience direct moderate, adverse social and economic impacts as they would have to change their fishing practices, or switch to other fisheries, to make up for lost shark revenues. There would likely be indirect adverse socio-economic impacts from this proposed action on other businesses that have an interest in the SCS fishery. This impact would be moderate in the short-term due to the small number of fishermen in the fishery, but would have a minor impact in the long-term as these businesses would modify their practices due to the changes in the fishery. Under alternatives A4 and B2, lost average annual gross revenues for all vessels landing non-blacknose SCS using gillnet gear would be \$287,524. Since there are 5-7 gillnet vessels that primarily target non-blacknose SCS with gillnet gear, these shark permit holders may experience higher losses. These fishermen would most likely experience the largest adverse social and economic impacts as they would have to leave the shark fishery, switch to other fisheries, or stop fishing altogether. Lost average annual gross revenues for all vessels landing blacknose sharks using gillnet gear under alternatives A4 and B2 would be \$90,501.

Under alternatives A4 and B3, landings of sharks with gillnet gear from South Carolina south, including the Gulf of Mexico and Caribbean Sea, would be prohibited. Approximately 24 directed shark permit holders and 5 incidental shark permit holders that used gillnet gear to land non-blacknose SCS, and approximately 13 directed shark permit holders and 2 incidental shark permit holders that used gillnet gear to land blacknose sharks, would experience additional losses. Shark fishermen with directed shark permits that use gillnets would presumably leave the

shark gillnet fishery and would experience significant short-term adverse socio-economic impacts as they would have to change their fishing practices, or switch to other fisheries. Fishermen with incidental shark permits would experience moderate adverse social and economic impacts, as they would have to change their fishing practices, or switch to other fisheries. Shark dealers and other entities that are indirectly tied to the shark fishery would most likely experience moderate short-term adverse social impacts, as they would have to diversify to make up for lost shark product. Lost average annual gross revenues for all shark permit holders landing non-blacknose SCS using gillnet gear would be \$275,057 under alternatives A4 and B3. Lost average annual gross revenues for all vessels landing blacknose sharks and using gillnet gear under alternatives A4 and B3 would be \$90,059. However, as with alternatives A4 and B2, since there are 5-7 gillnet vessels that primarily target blacknose sharks with gillnet gear, these shark permit holders may experience higher losses. As explained above, these fishermen would most likely experience the largest direct adverse impacts as they would have to leave the shark fishery and switch to other fisheries or stop fishing altogether.

LCS are also landed with gillnet gear, therefore, alternative A4 in combination with alternatives B2 and B3 could also impact LCS fishermen that use gillnet gear. Under this alternative, the approximate 11 and 5 vessels with directed and incidental shark permits, respectively, that used gillnet gear to land LCS would experience additional lost revenues under alternatives A4 and B2. Under alternatives A4 and B2, lost average annual gross revenues for all vessels landing LCS using gillnet gear would be \$109,339. This is approximately 3 percent of the average annual gross revenues for the entire LCS fishery. Under alternatives A4 and B3, approximately 10 directed shark permit holders and 2 incidental shark permit holders that used gillnet gear to land LCS would experience additional losses. Under alternatives A4 and B3, lost average annual gross revenues for all shark permit holders landing LCS using gillnet gear would be \$106,479. Given the significant adverse social and economic impacts of reduced quotas, removal of gillnet gear as an authorized gear type, and prohibiting incidental fishermen from retaining blacknose sharks, NMFS does not prefer alternative A4 at this time.

Alternative A5 would close the entire SCS commercial shark fishery, prohibiting the landing of any SCS, including finetooth, Atlantic sharpnose, bonnethead, and blacknose sharks. This alternative would have direct short-term significant, adverse, socio-economic impacts on fishermen with directed and incidental shark permits that fish for SCS. This action would require fishermen to switch to other fisheries, or leave the shark fishery altogether. This alternative would also have indirect moderate, adverse socio-economic impacts in the short-term on other businesses that generate revenue from shark products. These businesses would have to adjust by finding new ways to generate revenue, or find ways to cut costs. Alternative A5 would have a significant, short-term, adverse economic impact on the 85 directed shark permit holders, and the 31 incidental shark permit holders that had SCS landings during 2004 through 2007. The result would be a loss of average annual gross revenues of \$830,918 from SCS landings. In addition, as gillnet gear is the primary gear used to target SCS, it is assumed that directed shark gillnet fishing would cease, except for fishermen that use strikenets to fish for blacktip sharks. Approximately 11 directed shark permit holders also use gillnet gear to land LCS. This would result in a decrease in LCS landings of 46.3 mt dw and a decrease in average annual gross revenues by \$107,280. While this alternative could reduce blacknose mortality below the commercial allowance required to rebuild blacknose shark stocks, it would also drastically reduce non-blacknose SCS landings, and have the largest social and economic

impacts of all the alternatives considered. This action would also severely curtail data collection on all SCS that could be used for future stock assessments. Thus, NMFS does not prefer this alternative at this time.

Alternative A6, the preferred alternative, combines parts of alternatives A2 and A3 and would establish a blacknose species-specific quota of 19.9 mt dw and a non-blacknose SCS quota of 221.6 mt dw. Alternative A6 would set the non-blacknose SCS quota at a level equal to the average landings from 2004 through 2008, and the blacknose quota at a level that would be a 64 percent reduction of the average landings for that same time period. This new alternative was included in response to recently updated data from the SEFSC used for analysis and in response to public comments and concerns raised by the commercial fishing industry and scientific community during the comment period for the DEIS. Under alternative A6 all currently authorized gears for shark fishing would be allowed in the fishery, regardless of geographic region, and incidentally permitted fishermen would be allowed to retain blacknose sharks.

Under alternative A6, the 68 directed shark and 29 incidental shark permit holders that had non-blacknose SCS landings would be expected to fish as they currently do under the No Action alternative, and shark dealers and other entities that deal with shark products would be expected to operate as they do under the No Action alternative because the non-blacknose SCS quota would only be reduced to the level of the current average landings. It is anticipated that the directed shark permit holders' total annual average revenues from non-blacknose SCS landings would decrease by 6 percent from \$644,116 to \$601,832; a loss of \$42,284. Incidental shark permit holders' annual gross revenues from non-blacknose SCS landings would decrease by \$1,308, or 7 percent, from \$19,921 to \$18,613. Therefore, there would be minor direct adverse socio-economic impacts on directed and incidental shark permit holders in the long-term as a result of the non-blacknose SCS quota under alternative A6.

Under the blacknose shark quota of 19.9 mt dw, the 44 directed shark permit holders and 7 incidental shark permit holders that had blacknose shark landings could experience moderate, adverse socio-economic impacts, as they would most likely have to fish in other fisheries to make up for lost blacknose shark landings. Other entities indirectly involved in the fishery could experience neutral social and economic impacts as there would be minimal changes to their business practices to make up for lost blacknose shark product. In total, average annual gross revenues from blacknose shark landings for the directed shark permit holders would decrease from \$160,062 under the No Action alternative, to \$51,409 under alternative A6, which is a loss of \$108,653 or a 68 percent reduction in average annual gross revenues for blacknose sharks for directed shark fishermen. For incidental shark permit holders the reduction in blacknose shark landings would translate into an average annual gross revenue of \$3,869, which would be a loss of revenue of \$8,179 from the annual average of \$12,048 under the No Action alternative.

Under alternative A6, if either the non-blacknose SCS quota (221.6 mt dw) or blacknose shark quota (19.9 mt dw), reached 80 percent of the available landings, NMFS would close both fisheries for the rest of the season. If a future stock assessment determines that blacknose sharks are continuing to be overfished or that overfishing is still occurring, NMFS could make regulatory changes as needed in future management actions. These changes may include, but are not limited to, reducing the blacknose shark quota and/or the non-blacknose SCS quota, and implement daily blacknose catch limits. Alternative A6 would meet the rebuilding requirements

of the Magnuson-Stevens Act by addressing the overfished status of blacknose sharks by reducing the blacknose shark quota to 19.9 mt dw.

Since alternative A6 would set the non-blacknose SCS quota at a level equal to the average landings of the non-blacknose SCS species from 2004 – 2008, the direct socio-economic impact would be neutral in the short-term as the fishery would be prosecuted in a similar manner as it has been for several years. The long-term direct adverse impact of this alternative on the fishermen would be minor, as the reduction in quotas would lead to gradual changes in gear modification or fishing practices among a few in the fishing industry. Both the short- and long-term, indirect impacts from alternative A6 would be neutral, as other stakeholders in the shark fishing industry would experience negligible changes in the revenue due to how the shark fishery is prosecuted. For the reasons stated above, NMFS prefers alternative A6 at this time.

### *Conclusion*

Alternative A6 would result in minor, direct, beneficial ecological impacts for to blacknose shark stocks in the short- and long-term by reducing mortalities below the commercial allowance of 7,094 blacknose sharks per year that is necessary for this stock to rebuild with a 70 percent probability by 2027 consistent with the rebuilding plan and the objectives of this amendment. Alternative A6 would maintain fishing effort and mortality in the non-blacknose SCS fishery, to a level that would be equal to the average landings for these species for the years 2004 through 2008. Alternative A1 (No Action alternative) does not reduce effort or mortality in the commercial SCS fishery, so it does not address the overfished status or overfishing of blacknose sharks. The scenarios under alternative A2 that eliminate gillnets as an authorized gear, and those that eliminate retention of blacknose sharks altogether, fail to meet the goal of reducing blacknose shark mortality due to the high number of discards of blacknose sharks from those gears that would continue to operate in the fishery. For those scenarios under alternative A2 that would continue to allow gillnets to be retained as an authorized gear, the necessary reduction in blacknose sharks mortalities would be met, but the quota would be exceeded. Under alternative A3 the goal of reducing the blacknose shark mortality to necessary levels would be obtained, but due to the significant reduction of the non-blacknose SCS quota, there would be a 67 percent increase in discard mortality of non-blacknose SCS. Both alternatives A4 and A5 would achieve the necessary blacknose shark mortality reduction, but the social and economic impacts on the commercial shark permit holders from the reduced quotas would be significantly adverse.

Compared to the other alternatives analyzed, alternative A6 would result in the least direct adverse social and economic impacts on the participants of the SCS commercial fishery while still meeting the goal of reducing mortality and rebuilding blacknose sharks. Under alternative A6, the non-blacknose SCS quota of 221.6 mt dw would result in a loss of \$43,592 in average annual revenues for all permit holders. The reduced blacknose quota of 19.9 mt dw would result in a loss of \$116, 833 for all permit holders. Under alternative A2, directed and incidental permit holders would lose \$138,499 in average annual revenue, from the blacknose quota of 12.1 mt dw. Under alternative A3 as in alternative A6, the blacknose quota of 19.9 mt dw would result in an anticipated loss in average annual revenues for directed and incidental permit holders. The non-blacknose quota of 110.8 mt dw, under alternative A3, would result in a loss of average annual revenues to all permit holders of \$275,103. Under alternative A4, the

reduction in blacknose quota to 15.9 mt dw would result in an average annual loss of revenues for all permit holders of \$124,853. With the prohibition on gillnets in alternative A4, all permit holders would lose approximately \$287,524 from the reduced non-blacknose SCS quota and many would have to completely change the way they fished, or to leave the fishery entirely. Because alternative A5 would close the SCS fishery, those directed and incidental permit holders that land non-blacknose SCS and blacknose sharks would most likely move into other fisheries and could potentially create pressure on other commercial species. While alternative A1 the No Action alternative, would have the least direct adverse social and economic impacts on the SCS commercial fishery participants, this alternative does not reduce mortality of blacknose sharks in order to meet the rebuilding goals of this amendment or stop overfishing of this stock. NMFS understands that it cannot implement an alternative that minimizes social and economic impacts at the expense of rebuilding the blacknose shark in accordance with the required time-frames under subsection 304(e) of the Magnuson-Stevens Act, and alternative A6 does not do this. Alternative A6 reduces the blacknose quota so that this species can rebuild and it provides a framework by which rebuilding can occur as effectively as any other alternative consistent with the rebuilding plan while minimizing the significant adverse social and economic impacts on participants in the fishery and fishing dependent communities; therefore, NMFS prefers alternative A6 at this time.

#### **4.1.2 Commercial Gear Restrictions**

Currently BLL, PLL, gillnet, rod and reel, handline, and bandit gear are authorized gears in the Atlantic shark commercial fishery, however, BLL and gillnet gears are the primary gears used to harvest sharks. Gillnet gear is the primary gear that is used to harvest SCS, including blacknose sharks, whereas BLL gear is typically used to target LCS (although, some LCS are also caught in gillnet gear and some SCS are also caught on BLL gear). To reduce fishing pressure on blacknose sharks, NMFS is considering alternatives regarding commercially authorized gears to reduce mortality of blacknose sharks. As described in Chapter 2, the alternatives considered for commercial gear restrictions are:

- |                |   |
|----------------|---|
| Alternative B1 | <i>No Action. Maintain current authorized gears for commercial shark fishing – Preferred Alternative</i>                            |
| Alternative B2 | Close shark gillnet fishery; remove gillnet gear as an authorized gear type for commercial shark fishing                            |
| Alternative B3 | Close the gillnet fishery to commercial shark fishing from South Carolina south, including the Gulf of Mexico and the Caribbean Sea |

#### *Ecological Impacts*

In the DEIS, NMFS preferred alternative was B3, which would have closed the gillnet fishery to commercial shark fishing from South Carolina south, including the Gulf of Mexico and the Caribbean Sea. Because of comments received during the comment period, and based on recent analysis of updated gillnet observer data described below, NMFS has changed its preferred alternative to B1, the No Action alternative. This action would maintain the status quo, and retain all currently authorized gear used in the SCS fishery. Under alternative B1, all current restrictions regarding the usage of gears used in the shark fishery would remain in place such as: the requirement for BLL vessels to use corrodible hooks and safe handling and release gear, the

prohibition on gillnets over 2.5 km, and the requirement for gillnets to remain attached to the vessel.

Analysis of the 2005 – 2008 Shark Gillnet Observer Data indicates that gillnet fishermen are likely able to target specific species while avoiding others. In data collected from 146 directed shark trips that targeted other shark species, the percentage of blacknose sharks caught in those trips were: 2.6 percent from 5 trips that targeted blacktip sharks, 1.4 percent from 17 trips that targeted Atlantic sharpnose sharks, 8.3 percent from six trips that targeted bonnethead sharks, and 3.9 percent from 118 unspecified shark trips. This same analysis also indicated that the mortality rate for blacknose sharks caught in gillnets was lower than previously believed. These findings have allowed NMFS to modify the mortality rate for blacknose sharks in the gillnet fishery from 100 percent used in the DEIS to 80 percent in this document.

Along with the changes described above, new data collected by the SEFSC resulted in a change in the average size of blacknose sharks caught in gillnets, from 14.7 lb dw that was used in the DEIS to 18.7 lb dw used in the FEIS. Because of the smaller average size of blacknose sharks caught by other gears used in the shark fisheries, NMFS believes that eliminating gillnets as an authorized gear would result in a higher mortality rate for neonate and juvenile blacknose sharks, as landings would come from these gears exclusively. It is therefore NMFS' intention to give gillnet fishermen the opportunity to continue to fish while further data is collected on their ability to successfully avoid blacknose sharks.

Since there would be no change to the gear restrictions under alternative B1, the direct ecological impacts associated with this action would be neutral, or the same as the status quo. In addition, implementing alternative B1 in conjunction with alternative A6 (the preferred alternative), which would set the non-blacknose SCS quota equal to the average landings of SCS (221.6 mt dw) from 2004 – 2008, should result in neutral direct ecological impacts for non-blacknose SCS sharks, since these species have been determined to not be overfished. Retaining gillnet gear as an authorized gear in the shark fishery would likely result in no change in the impacts on LCS in the short or long-term, since bottom longlines are the primary gear type used in the LCS fishery. The directed and incidental shark landings from gillnet gear only account for three percent of the total LCS fishery.

Historical data also indicates that the impact of gillnets on non-shark protected species (marine mammals, turtles, etc.) has been minimal, with infrequent interactions over the last few years, and none in 2008 (Passerotti and Carlson, 2009). Between 2000 and 2007, a total of 16 marine turtles have been observed caught in the shark gillnet fisheries, of those 16 turtles, 10 were released alive, 2 were released dead, and 4 were of unknown condition (Passerotti and Carlson, 2008). Observed takes of marine mammals in the Southeast Atlantic shark gillnet fishery during 1999 – 2007 totaled 12 bottlenose dolphins and 4 spotted dolphins (Garrison, 2007). Therefore, under the No Action alternative, NMFS expects the ecological impacts on protected resources to be neutral in both the short-term and the long-term.

Under alternative B2, NMFS would remove gillnets as an authorized gear type for commercial shark fishing in federal waters. This alternative would allow shark LAP holders to continue to use other commercially authorized gears such as BLL, rod and reel, handline, or bandit gear. As previously mentioned, the mortality rate for blacknose sharks for non-gillnet

gear in the SCS fishery is higher than for gillnet gear, and the average size of blacknose sharks caught in other gears in the SCS fishery is smaller than those caught in gillnets. NMFS believes that if the gillnet fishery is closed, the non-sandbar SCS quota and blacknose specific quota would be landed by other gears authorized to fish in the SCS fishery, resulting in a higher rate of dead discards and more landings of juvenile and neonate blacknose sharks.

Because of the direct impact on blacknose sharks described above, alternative B2 would result in minor adverse ecological impacts in the short-term, but those impacts could increase to moderate in the long-term as the discard rate for blacknose sharks could put pressure on the stock. This alternative would also have adverse impacts on other fisheries that use gillnets, such as the smooth dogfish fishery and LCS fishery. The smooth dogfish fishery occurs in both state and federal waters, and gillnets are the primary gear type used in this fishery. At this time, smooth dogfish are not currently managed under a federal fishery management plan, and a stock assessment has not been conducted for this species. Alternative B2 would ban all gillnets in federal waters, which would limit landings of smooth dogfish to some state waters only. This could result in an increase in fishing pressure for smooth dogfish in state waters and also increase fishing pressure on other fisheries as some gillnet fishermen might switch to other gears or target other species. Since there has not been a stock assessment conducted for smooth dogfish, and due to the potential for adverse social and economic impacts as described below on fishermen in the LCS, SCS and smooth dogfish fisheries, NMFS does not prefer this alternative at this time.

Under alternative B3, NMFS would close the gillnet fishery to commercial shark fishing from South Carolina south, including the Gulf of Mexico and Caribbean Sea. As previously mentioned, the mortality rate for blacknose sharks for non-gillnet gear in the SCS fishery is higher than for gillnet gear, and the average size of blacknose sharks caught in these is smaller than those caught in gillnets. NMFS believes that if the gillnet fishery is closed, the non-sandbar SCS quota and blacknose specific quota would be landed by other gears authorized to fish in the SCS fishery, resulting in a higher rate of dead discards and more landings of juvenile and neonate blacknose sharks. The direct ecological impact on blacknose sharks would be minor in the short-term, but could increase over the long-term to moderate. Alternative B3 would also limit landings of smooth dogfish to some state waters as gillnets would be banned in federal waters from South Carolina south. This action could result in an increase in fishing pressure for smooth dogfish in some state waters, and also increase fishing pressure on other fisheries, as gillnet fishermen may switch to other gears or target other species.

Alternative B3 would have minor adverse ecological impacts on the LCS fishery as the majority of fishermen in this fishery use BLL gear. With the prohibition of gillnets from South Carolina south, total landings/year of LCS are only anticipated to decrease by three percent. There would also be minimal, direct adverse ecological impacts to the smooth dogfish fishery, since this species is primarily caught from North Carolina north. The smooth dogfish fishery is currently not managed on a federal level, and the exact ecological impacts would vary based on the landings of commercial and recreational fishermen.

As described under alternative B1, the interaction of gillnets with protected species is minimal, and the removal of gillnet gear from South Carolina south would have minor beneficial impacts on already low interaction rates. For the reasons regarding the increased dead discard

rate of blacknose sharks described above, and the adverse economic impact on the fisheries described below, NMFS does not prefer alternative B3 at this time. If future analysis determines that gillnet fishermen are not able to avoid certain species, then NMFS would revisit this alternative at that time.

### *Social and Economic Impacts*

Under alternative B1, the No Action alternative, NMFS would maintain the current authorized gears for commercial shark fishing. Therefore, the social and economic impacts of alternative B1 would be neutral, or the same as the status quo, and no adverse social or economic impacts would be anticipated under alternative B1. The average number of directed and incidental shark permit holders that reported SCS landings in the Coastal Fisheries logbook from 2004 through 2007 were 116 (85 directed and 31 incidental), and the LCS fishery had an annual average of 162 shark permit holders (129 directed and 33 incidental) reporting LCS landings in the Coastal Fisheries logbook for that same time period.

Under alternative B2, which would close the shark gillnet fishery in federal waters, NMFS would remove gillnet gear as an authorized gear type for commercial shark fishing. This alternative would have minor direct adverse social and economic impacts in the short-term, but these impacts could become moderate in the long-term due to the potential effect on 30 directed and seven incidental shark permit holders that land SCS with gillnets. This action could force some fishermen to redirect their fishing efforts to new fisheries or use different gear types, which over time could result in moderate adverse pressure on these fisheries. Alternative B2 would also have an adverse impact on the total annual landings of SCS. Directed shark permit holders could lose approximately \$365,955 in average annual gross revenues from SCS landings. Incidental shark permit holders could lose approximately \$11,973 in average annual gross revenues from SCS landings.

Alternative B2 would have minor direct adverse social and economic impacts on the LCS fishery. Only 11 directed and five incidental shark permit holders out of the 162 total shark permit holders would be affected. Under this alternative shark fishermen with directed shark permits would lose approximately \$107,280 in average annual gross revenues from LCS landings. Incidental shark permit holders would lose approximately \$2,059 in average annual gross revenues from LCS landings.

Gillnets are the primary gear type used to catch smooth dogfish. An estimated 223 vessels could be affected by the gillnet prohibition under alternative B2 would require a smooth dogfish permit. However, as fishermen are currently not required to have a permit to retain smooth dogfish, this could be an underestimate of the number of fishermen that would require a federal commercial permit for smooth dogfish in the future. According to ACCSP data, the average total landings per year from 1998 through 2007 was 950,859 lb dw. Using ex-vessel prices per pound from 2004 – 2007 these landings equate to \$357,286 in average annual gross revenues for the entire smooth dogfish fishery. Implementing alternative B2 would likely have direct adverse, short-term and long-term, socio-economic impacts on fishermen who previously used gillnet gear in federal waters to land smooth dogfish. Given the potential for adverse social and economic impacts of this alternative on the SCS, LCS, and smooth dogfish fisheries, NMFS does not prefer this alternative at this time.

Under alternative B3, NMFS would close the commercial gillnet fishery from South Carolina south, including the Gulf of Mexico and the Caribbean Sea. In the short-term there would be direct adverse social and economic impacts of this action, but these would be minor. These adverse impacts could increase to moderate over time for the directed and incidental shark fishermen that would be affected. In the SCS fishery, this alternative would affect 27 directed and 5 incidental shark permit holders out of the 116 total shark permit holders that land SCS. The SCS gillnet fishery from South Carolina south accounts for 44 percent of the total directed SCS fishery landings, and 26 percent of incidental landings. Fishermen with directed and incidental shark permits would experience an estimated \$365,068 reduction of average annual gross revenues from SCS landings. Alternative B3 would have minor, direct and indirect, socio-economic impacts on the LCS fishery in the short- and long-term. NMFS estimates that this action would affect 12 directed and incidental shark permit holders (out of 162 total shark permit holders). The directed and incidental shark permit holders would lose \$106,479 in average annual gross revenues from lost LCS landings due to the ban on gillnet gear under alternative B3. NMFS does not prefer this alternative at this time due to the potential for adverse economic and social impacts on commercial permit holders in the SCS and LCS fisheries.

### *Conclusion*

Blacknose sharks have been determined to be overfished with overfishing occurring. According to the latest blacknose stock assessment, NMFS needs to reduce mortality in the Atlantic shark commercial fishery by 78 percent, or keep blacknose shark mortality below 7,094 blacknose sharks/year. The preferred alternative, B1 (No Action alternative), would continue to allow all current authorized gears. NMFS' most recent analysis indicates that gillnet fishermen are likely able to target certain species, and avoid others. NMFS believes that more data are necessary to determine if the gillnet fishermen can avoid certain species before it makes a decision to eliminate that gear from the fishery. Both alternatives B2 and B3 would have direct adverse ecological impacts for the blacknose shark stocks because of high discard rates with BLL gear, many of which could be juveniles. Thus, NMFS believes that the adverse ecological impacts, combined with the adverse social and economic impacts, of alternatives B2 and B3 justifies changing the preferred alternative from B3 to B1 in this FEIS. In addition, NMFS believes that allowing gillnet gear as an authorized gear for sharks is consistent with the 2008 BiOp for the Atlantic Shark fishery.

The 2008 BiOp was completed for Amendment 2 to the Consolidated HMS FMP, which did not prohibit the use of gillnet gear; therefore, the 2008 BiOp was based on the continued use of gillnet gear in the Atlantic Shark fishery and concluded that the Atlantic shark fishery is not likely to jeopardize the continued existence of endangered green, leatherback, and Kemp's ridley sea turtles; the endangered smalltooth sawfish; or the threatened loggerhead sea turtle. Furthermore, the BiOp concluded that the Atlantic shark fishery was not likely to adversely affect any listed species of marine mammals, invertebrates (*i.e.*, listed species of coral) or other listed species of fishes (*i.e.*, Gulf sturgeon and Atlantic salmon) in the action area.

Alternative B2 would have an adverse social and economic impact by potentially affecting 30 directed and seven incidental shark permit holders that land SCS with gillnets. Under this alternative, directed shark permit holders would lose approximately \$367,007 in

average annual gross revenues from SCS landings, while incidental shark permit holders that use gillnets would lose approximately \$12,017. Alternative B2 would have minor direct adverse social and economic impacts on the LCS fishery. For alternative B3, the social and economic consequences could impact approximately 37 directed and seven incidental SCS and LCS permit holders. It would also reduce SCS and LCS revenues for directed permit holders by \$464,450 and SCS and LCS revenues for incidental permit holders by \$7,097. This is a total loss of \$471,547 due to the elimination of gillnet gear from South Carolina south. Because of these potential adverse social and economic impacts on the fishermen and the fishing communities that participate in the SCS fishery, NMFS prefers alternative B1 at this time.

#### **4.1.3 Pelagic Shark Effort Controls**

In 2008, an updated stock assessment for shortfin mako sharks was conducted by ICCAT's SCRS. For North Atlantic shortfin mako sharks, multiple model outcomes indicated stock depletion to be about 50 percent of virgin biomass (1950s levels) and levels of  $F$  above those resulting in MSY, whereas other models estimated considerably lower levels of depletion and no overfishing. The SCRS determined that there is a "non-negligible probability" that the North Atlantic shortfin mako stock could be below the biomass that could support MSY ( $B_{2007}/B_{msy} = 0.95-1.65$ ) and above the fishing mortality rate associated with MSY ( $F_{2007}/F_{msy} = 0.48-3.77$ ). Similar outcomes were determined by the SCRS from the 2004 assessment; however, recent biological data show decreased productivity for this species. Therefore, given the results of this assessment, NMFS has determined that North Atlantic shortfin mako is not overfished, but is approaching an overfished status and is experiencing overfishing.

There are several ICCAT recommendations that pertain to sharks. In 2004, ICCAT adopted *Recommendation 04-10 Concerning the Conservation of Sharks Caught in Association with Fisheries Managed by ICCAT*. This was the first binding measure passed by ICCAT dealing specifically with sharks. This recommendation included, among other measures: reporting of shark catch data by Contracting Parties, a ban on shark finning, a request for Contracting Parties to live-release sharks that are caught incidentally, a review of management alternatives from the 2004 assessment on blue and shortfin mako sharks, and a commitment to conduct another stock assessment of selected pelagic shark species no later than 2007. In 2005, additional measures pertaining to pelagic sharks were added to the 2004 recommendation. Measures included a requirement for Contracting Parties that have not yet implemented the 2004 recommendation, to reduce shortfin mako mortality and to report their progress to the Secretariat. In 2006, a recommendation was adopted that amended a paragraph in Recommendation 04-10 that recommended management alternatives and a stock assessment for blue and shortfin mako sharks. At the 2007 meeting, ICCAT adopted measures for the conservation of sharks (Recommendation 07-06) that included requirements to submit Task I and Task II data on bycatch and targeted fisheries for sharks, and to reduce fishing mortality in fisheries targeting porbeagle and shortfin mako sharks. Recommendation 08-07, adopted at the 2008 ICCAT meeting, called for the live release of bigeye thresher sharks.

As described in Chapter 2, the alternatives considered for pelagic shark in the commercial fishery are:

- Alternative C1 No Action. Keep shortfin mako sharks in the pelagic shark species complex and maintain the quota
- Alternative C2 Remove shortfin mako sharks from pelagic shark species quota and establish a shortfin mako quota
- Alternative C3 Remove shortfin mako sharks from pelagic shark species complex and place this species on the prohibited shark species list
- Alternative C4 Establish a commercial size limit for shortfin mako sharks
  - Alternative C4a) Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of female shortfin mako sharks reach the sexual maturity or 32 inches interdorsal length (IDL)
  - Alternative C4b) Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of male shortfin mako sharks reach the sexual maturity or 22 inches IDL
- Alternative C5 *Take action at the international level to end overfishing of shortfin mako sharks – Preferred Alternative*
- Alternative C6 *Promote the release of shortfin mako sharks brought to fishing vessels alive – Preferred Alternative*

### *Ecological Impacts*

Alternative C1 is the No Action alternative and would maintain the existing regulations for shortfin mako sharks. The current commercial quota for common thresher, oceanic whitetip and shortfin mako sharks is 488 mt dw. This alternative would have short- and long-term indirect, neutral ecological impacts for other species, such as common thresher and oceanic whitetip sharks, and would likely maintain fishing mortality of shortfin mako sharks at current levels, which may have slightly adverse ecological impacts based on the 2008 ICCAT stock assessment. According to the 2008 ICCAT stock assessment, NMFS determined that shortfin mako sharks were experiencing overfishing, but were not overfished. While the average annual commercial landings of shortfin mako sharks, from 2004 to 2007, were 72.5 mt dw (NMFS, 2008) and the existing 488 mt dw commercial quota for shortfin mako, common thresher, and oceanic whitetip sharks has not been fully utilized, landings of shortfin mako sharks could increase above current levels. If the landings of shortfin mako sharks continue at current levels or increase, this could lead to further overfishing and short- and long-term direct, minor adverse, ecological impacts for this species. However, the United States' commercial harvest of Atlantic shortfin mako sharks has historically been incidental in nature and comprised of approximately nine percent (3431 mt ww / 39,769 mt ww= 8.6 percent) of the recorded total North Atlantic shortfin mako international landings from 1997 through 2008 (Table 4.6). Cumulatively, this alternative and other actions are expected to have minor, adverse, ecological impacts, because overfishing could continue on shortfin mako sharks. Due to the small U.S. contribution to the Atlantic-wide shortfin mako shark mortality, domestic reductions on shortfin mako shark mortality alone would not end overfishing of the entire North Atlantic stock. Therefore, NMFS does not prefer alternative C1 at this time.

**Table 4.6 Estimated Commercial Catches (mt) (ww) of Shortfin Mako Shark Reported to ICCAT (landings and discards) by Major Gear and Flag between 1997 and 2008 (NLD=No Landing Data).**

Source: (SCRS, 2009)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	
<i>North Atlantic Total</i>	3334	3083	2689	2482	2646	3071	3797	4802	3353	3318	3822	3372	
<b>LANDINGS</b>	Canada	110	69	70	78	69	78	73	80	91	71	72	43
	China P.R.	0	0	0	0	0	0	0	0	0	0	81	16
	Chinese Taipei	0	0	0	0	0	0	84	57	19	31	27	23
	EC. España	2416	2199	2051	1566	1684	2047	2068	3404	1751	1918	1816	1895
	EC. Portugal	354	307	327	318	378	415	1249	473	1109	951	1540	1021
	EC. United Kingdom	0	0	2	3	2	1	1	1	0	0	0	1
	Japan	258	892	120	138	105	438	267	572	0	0	82	140
	Mexico	0	0	0	10	16	0	10	6	9	5	8	6
	Panama	0	0	1	0	0	0	0	0	0	0	49	13
	Philippines	0	0	1	0	0	0	0	0	0	0	0	NLD
	Senegal	0	0	0	0	0	0	0	0	0	0	8	17
	St. Vincent and Grenadines	0	0	3	0	0	0	0	0	0	0	0	NLD
	Trinidad and Tobago	0	0	1	0	1	2	3	1	2	1	1	1
	USA	407	347	159	454	395	415	142	411	187	130	216	168
UK. Bermuda	1	2	0	0	0	0	0	0	0	0	0	0	
Venezuela	0	0	0	0	0	0	0	58	20	6	11	2	

Alternative C2 would remove shortfin mako sharks from the pelagic shark species quota, and would establish a species-specific quota for shortfin mako sharks equal to the current average landings. Shortfin mako sharks are caught as bycatch in the PLL fishery, and there is no directed fishery in the United States for this species. Currently, the annual quota for common thresher, oceanic whitetip, and shortfin mako is 488 mt dw. Based on the average annual commercial landings of shortfin mako sharks from 2004-2007, the species-specific quota for shortfin mako sharks would be 72.5 mt dw (NMFS, 2008). The common thresher and oceanic whitetip sharks would be allocated a quota of 415.5 mt dw after removal of the shortfin mako quota of 72.5 mt dw (488 mt dw – 72.5 mt dw = 415.5 mt dw). Removing shortfin mako sharks from the quota group of pelagic sharks would allow them to be managed separately and would give NMFS the ability to track this separate quota more efficiently. The 2008 ICCAT stock assessment did not recommend a TAC necessary to stop overfishing of shortfin mako sharks. Therefore, it is difficult to determine if setting a species-specific quota for shortfin mako sharks at the level of current commercial landings would have positive ecological benefits for the stock, as this scenario was not explored in this stock assessment. However, setting a quota of 72.5 mt dw for shortfin mako sharks would maintain fishing mortality at current levels and prevent commercial landings from increasing. This species-specific quota may provide long-term direct, minor beneficial ecological impacts over maintaining the quota at 488 mt dw for common thresher, oceanic whitetip, and shortfin mako sharks. Short-term direct, ecological impacts would be neutral for alternative C2 because any reduction in shortfin mako shark mortality would not be reflected in population estimates in the short-term due to the life history parameters of the shortfin mako shark. Cumulative impacts of this alternative and other actions are expected to be neutral because domestic commercial fishing practices would not dramatically change

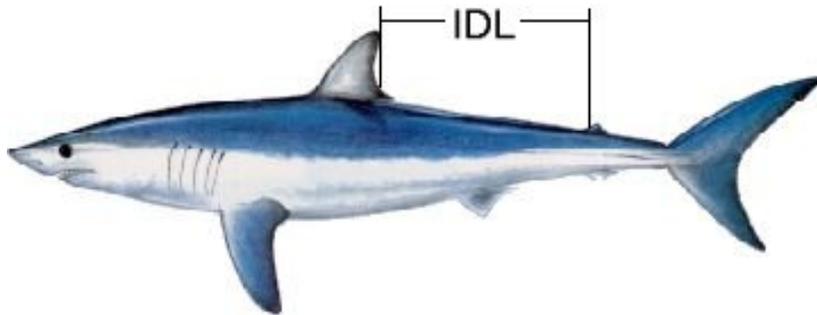
under this alternative. Because there are no current stock assessments for oceanic whitetip or common thresher sharks, it is difficult to determine the ecological impacts of setting a quota of 415.5 mt dw for these two species. Current average annual commercial landings from 2004 to 2007 for common thresher and oceanic whitetip combined, was 17.5 mt dw (NMFS, 2008). It is not expected that the level of fishing effort or mortality would increase under this alternative, and therefore, alternative C2 would have short- and long-term indirect neutral ecological impacts for common thresher and oceanic whitetip sharks. The shortfin mako shark mortality associated with current U.S. landings is minimal when compared to the total North Atlantic shortfin mako shark mortality. Without a recommended TAC, the total mortality reduction that is necessary to end overfishing of shortfin mako sharks is unknown, and limiting harvest to current levels would not have any meaningful impact on ending overfishing of the stock due to substantial and disproportionate levels of harvest by other nations. Therefore, NMFS does not prefer this alternative at this time.

Alternative C3 would add shortfin mako sharks to the prohibited species list. Adding shortfin mako sharks to the prohibited species list would make it illegal to retain and land shortfin mako sharks commercially or recreationally. NMFS has established criteria for adding shark species to the prohibited species list; a species can be added if two of the following four criteria are met: 1) There is sufficient biological information to indicate the stock warrants protection, such as indications of depletion or low reproductive potential or the species is on the ESA candidate list; 2) the species is rarely encountered or observed caught in HMS fisheries; 3) the species is not commonly encountered or observed caught as bycatch in fishing operations; or 4) the species is difficult to distinguish from other prohibited species (*i.e.*, look-alike issue). Shortfin mako sharks were determined to have overfishing occurring based on the 2008 ICCAT stock assessment and could, therefore, meet the first criterion. In addition, shortfin mako sharks look similar to other sharks on the prohibited species list (*i.e.*, white sharks and longfin mako sharks) and could, therefore, meet the fourth criterion. This alternative is expected to have long-term direct, minor beneficial ecological impacts for this stock. Short-term direct, ecological impacts would be neutral for alternative C3 because any reduction in shortfin mako shark mortality would not be reflected in population estimates in the short-term due to the life history parameters of the shortfin mako shark. Cumulative and short- and long-term indirect ecological impacts of adding the shortfin mako shark to the prohibited species list are expected to be neutral because it would not dramatically change domestic commercial fishing practices and any shortfin mako sharks caught would be discarded. Average commercial landings of shortfin mako sharks from 2004 to 2007 were 72.5 mt dw and were well below the 488 mt dw quota as they are primarily caught incidentally in the PLL fishery. According to observer reports from 1992-2006, 68.9 percent of shortfin mako sharks are brought to the vessel alive and 30.1 percent come to the vessel dead. Also, of the shortfin mako sharks that are caught, 61.4 percent are kept, 22.1 percent are discarded alive, and 9.9 percent are discarded dead. These data indicates that although prohibiting the retention of shortfin mako sharks may have more beneficial ecological impacts for this stock than alternative C2, this alternative could also result in a slight increase of dead discards because retention of shortfin mako sharks that arrive at the vessel dead would be prohibited. In addition, the United States does not have a directed commercial fishery for this species and contributes a small proportion of Atlantic-wide fishing mortality of shortfin mako sharks (Table 4.6). The mortality reduction associated with a prohibition on harvest shortfin mako sharks in the U.S. fishery would not have any meaningful impact on ending overfishing of

the stock due to substantial and disproportionate levels of harvest by other nations, and without a recommended TAC from the stock assessment, the total mortality reduction that is necessary to end overfishing of shortfin mako sharks is unknown. Therefore, NMFS does not prefer alternative C3 at this time.

Alternative C4 would establish a commercial size limit for shortfin mako sharks. Currently, there is no commercial minimum size limit for shortfin mako sharks; therefore, establishing a size limit could result in long-term direct, minor beneficial, ecological impacts, as there would be a decrease in shortfin mako shark mortality. Short-term direct, ecological impacts would be neutral for alternative C4 because any reduction in shortfin mako shark mortality would not be reflected in population estimates in the short-term due to the life history parameters of the shortfin mako shark. The short- and long-term indirect ecological impacts of creating shortfin mako shark size limits are expected to be neutral, because size limits would apply explicitly to shortfin mako sharks. Cumulative impacts of this alternative combined with other actions are expected to be neutral because domestic commercial fishing practices would not dramatically change under this alternative. Two size limits have been analyzed for shortfin mako sharks, one based on the size at which 50 percent of females reach sexual maturity (Alternative C4a) and one based on the size at which 50 percent of males reach sexual maturity (Alternative C4b). For each alternative, fork length (FL) estimates of sexual maturity were used from Natanson *et al.* (2006) (185 cm FL for males and 275 cm FL for females, respectively), converted to inches, and rounded to the nearest inch (in) to determine the size limit for each alternative to be analyzed. The size limit for alternative C4a, the size at 50 percent female sexual maturity, was determined to be 108 inches FL, and the size limit for alternative C4b, the size at 50 percent male sexual maturity, was determined to be 73 inches FL.

Because shortfin mako sharks are dressed at sea by the commercial fleet, a minimum FL measurement would be ineffective in enforcing a size limit. Therefore, an interdorsal length (IDL) measurement (the straight line measurement from the base of the trailing edge of the first dorsal fin to the base of the leading edge of the second dorsal fin) would be utilized. To convert from straight FL to IDL, NMFS converted FL to curved fork length (CFL) using a conversion formula from Francis and Duffy (2005), and then converted CFL to IDL using a conversion formula from Campana *et al.* (2005). This number was then converted to inches and rounded to the nearest inch to determine the size limit for each alternative to be analyzed. The IDL size limit for alternative C4a that corresponds to female sexual maturity was determined to be 32 inches IDL, and the size limit for alternative C4b that corresponded to male sexual maturity was determined to be 22 inches IDL.



**Figure 4.1** Interdorsal length measurement used for shortfin mako size limit analysis in alternatives C4a and C4b.

To assess the potential ecological impacts of implementing a commercial size limit for shortfin mako sharks, as in alternatives C4a and C4b, NMFS examined commercial fisheries data from the POP and HMS Logbook (logbook) in its analysis. The POP data covered all observed PLL shortfin mako shark catches from 1992-2006 regarding the size, number caught, disposition of the catch, and at-vessel mortality status. Logbook data covered landings, dead discards, and live releases of shortfin mako sharks by PLL and BLL fishermen from 2004-2007.

NMFS analyzed the POP data to determine the percentage of shortfin mako sharks that are currently landed that would be released alive if commercial size limits in alternatives C4a and C4b were implemented. Based on the POP data, the total number of shortfin mako sharks caught was 4,375. Of the 4,375 shortfin mako sharks that were caught, 208 were kept that were less than 32 inches IDL and nine were kept that were less than 22 inches IDL. In order to determine how many additional shortfin mako sharks would be released alive if either size limit was implemented, the at-vessel survival rates from the POP data were used for this analysis. Based on the POP data, 65.6 percent of shortfin mako sharks less than 32 inches IDL were brought to the vessel alive and 80.4 percent shortfin mako sharks less than 22 inches IDL were brought to the vessel alive. These survival rates were then used to determine the number of shortfin mako sharks that would be released alive given each size limit under alternatives C4a and C4b.

For alternative C4a, the number of shortfin mako sharks kept under 32 inches IDL (208 shortfin mako sharks) was multiplied by the percentage of shortfin mako sharks that came to the vessel alive under 32 inches IDL (65.5 percent), to determine the number of shortfin mako sharks that could be released alive under this size limit ( $208 \times 65.6 \text{ percent} = 136$  shortfin mako sharks released alive). This number was then divided by the total number of shortfin mako sharks caught according to the POP data to find the percentage of additional shortfin mako sharks that would be released alive if a size limit of 32 inches IDL was implemented ( $136 / 4,375 = 3.1 \text{ percent}$ ) (Table 4.7). The percent of additional shortfin mako sharks released alive under 32 inches IDL (3.1 percent) was then applied to the HMS logbook data to determine the estimated number of additional shortfin mako sharks that would be released alive under 32 inches IDL. On average, from 2004 to 2007, 2,845 shortfin mako sharks were kept per year according to the HMS logbook data. In addition, 47 shortfin mako sharks of all sizes were released alive according to the logbook data. When applying the percentage of additional shortfin mako sharks that would be released alive given the 32 inches IDL size limit (3.1 percent) to the number of shortfin mako sharks kept per the logbook data (2,845 shortfin mako

sharks), an additional 89 shortfin mako sharks would be released alive every year if a size limit of 32 inches IDL were implemented. This represents an increase of 89 shortfin mako sharks released alive annually in the PLL and BLL fisheries (Table 4.7).

NMFS assumes that not all shortfin mako sharks kept are alive when reaching the vessel; therefore, imposing a size limit could lead to an increase in dead discards. NMFS calculated the number of additional dead discards expected due to an IDL size limit of 32 inches using the same methodology for calculating live releases described above, with an at-vessel mortality rate of 34.5 percent. Alternative C4a would result in an estimated increase of 46 shortfin mako sharks discarded dead annually in the PLL and BLL fisheries (Table 4.8). It is important to note that, although shortfin mako shark dead discards may increase under the size limit in alternative C4a, no additional shortfin mako shark mortality would result from implementing this size limit.

To estimate the number of additional shortfin mako sharks anticipated to be released alive under alternative C4b, NMFS multiplied the number of shortfin mako sharks kept under 22 inches IDL (nine shortfin mako sharks) by the percentage of shortfin mako sharks that came to the vessels alive under 73 inches (80.4 percent), which equals seven shortfin mako sharks released alive under 22 inches IDL. The number of shortfin mako sharks released alive was divided by the total number of shortfin mako sharks caught, according to the POP data, to find the percentage of the total catch that would be released alive if a size limit of 22 inches IDL was implemented ( $7 / 4,375 = 0.17$  percent) (Table 4.7). The percentage of additional shortfin mako sharks released alive under 22 inches IDL (0.17 percent) was then applied to the HMS logbook data to determine the estimated number of additional shortfin mako sharks released alive under 22 inches IDL. On average, from 2004 to 2007, 2,845 shortfin mako sharks were kept per year according to the HMS logbook data. In addition, 47 shortfin mako sharks of all sizes were released alive according to the logbook data. When applying the percentage of additional shortfin mako sharks that would be released alive given the 22 inches IDL size limit (0.17 percent) to the number of shortfin mako sharks kept per the logbook data (2,845 shortfin mako sharks), an additional five shortfin mako sharks would be released alive every year if a size limit of 22 inches IDL were implemented. This represents an estimated increase of five shortfin mako sharks released alive annually in the PLL and BLL fisheries (Table 4.7).

NMFS assumes that not all shortfin mako sharks kept are alive when reaching the vessel; therefore, imposing a size limit could lead to an increase in dead discards. Thus, NMFS calculated additional dead discards associated with a 22 inches IDL size limit using the same methodology for calculating live releases as described above, with an at-vessel mortality rate of 19.6 percent. Alternative C4b would lead to an estimated increase of one shortfin mako shark dead discard annually in the PLL and BLL fisheries (Table 4.8). It is important to note that although shortfin mako shark dead discards may increase under the size limit in alternative C4b, no additional shortfin mako shark mortality would result from implementing this size limit.

**Table 4.7 Comparison of commercial size limits for shortfin mako sharks (SFM), and their estimated affect on shortfin mako shark live releases.**

Alt.	A Size Limit (inches IDL)	B Total SFM catch (POP)	C Total number of SFM kept (POP)	D Number of SFM kept under size limit (POP)	E Estimated number of SFM released alive under size limit	F Percentage of additional shortfin mako released alive under size limit  E/B	G Average number of SFM kept per year (logbook)  D	H Estimated number of additional SFM released alive under size limit  F*G	I Average number of all SFM released alive (logbook)	J Estimated number of SFM released alive per year under size limit  H+I
C4a	32	4375	2535	208	136	3.12%	2845	89	47	136
C4b	22	4375	2535	9	7	0.17%	2845	5	47	53

**Table 4.8 Comparison of commercial size limits for shortfin mako sharks (SFM), and their estimated affect on shortfin mako shark dead discards.**

Alt.	A Size Limit (inches IDL)	B Total SFM catch (POP)	C Total number of SFM kept (POP)	D Number of SFM kept under size limit (POP)	E Estimated number of SFM dead discards under size limit	F Percentage of additional shortfin mako dead discards under size limit  E/A	G Average number of SFM kept per year (logbook)	H Estimated number of additional SFM dead discards under size limit  F*G	I Average number of SFM dead discards per year (logbook)	J Estimated number of SFM dead discards per year under size limit (logbook)  H+I
C4a	32	4375	2535	208	72	1.64%	2845	46	7	53
C4b	22	4375	2535	9	2	0.04%	2845	1	7	8

Alternatives C4a and C4b would both result in long-term direct, minor beneficial, ecological impacts to the shortfin mako shark stock, as more shortfin mako sharks would be released alive than under the No Action alternative. The beneficial impacts are less in C4b than in C4a because there are fewer shortfin mako sharks released alive under C4a. Also, retention of immature female sharks would still be allowed in alternative C4b because the size limit is set at the size at which 50 percent of males reach sexual maturity, which is lower than the size at which 50 percent of females reach sexual maturity. Alternative C4a would result in 84 more live releases of more shortfin mako sharks than alternative C4b, and retention of immature females would be minimized because the size limit would equal the size at which 50 percent of females reached sexual maturity. Without a TAC recommendation from the stock assessment, it is unknown what mortality reduction is necessary to end overfishing of shortfin mako sharks. Given the relatively few number of additional live releases of shortfin mako sharks under either alternative C4a or C4b, and that reductions in shortfin mako shark mortality under these alternatives would not have any meaningful impact on ending overfishing of the stock due to substantial and disproportionate levels of harvest by other nations, NMFS does not prefer either alternative at this time.

Under alternative C5, the preferred alternative, NMFS would take action at the international level through international fisheries management organizations to develop management measures applicable to all participating nations to end overfishing of shortfin mako sharks. ICCAT assumes three shortfin mako shark stocks for assessment purposes: northern and southern Atlantic stocks, separated at 5°N latitude, and a Mediterranean stock. Based on the 2008 SCRS stock assessment on the North Atlantic shortfin mako shark population, NMFS determined domestically that the species is experiencing overfishing and approaching an overfished status. According to ICCAT estimates, U.S. shortfin mako shark annual commercial landings did not exceed 11,000 fish from 1992 to 2008 (Table 4.9). Total shortfin mako shark landing estimates that were attributable to the domestic commercial fishery were slightly lower than the domestic recreational fishery over the same time period (Table 4.9). PLL discards of shortfin mako sharks were negligible since the meat of this species is highly valued, with a median real dollar, U.S. ex-vessel price per pound of \$1.59 from 2004 to 2007. U.S. commercial harvest of Atlantic shortfin mako sharks has historically been approximately 9 percent of the recorded total international landings, based on 1997 through 2008 data (Table 4.6). Because of the small U.S. contribution to North Atlantic shortfin mako shark mortality, and the lack of a TAC recommendation from the stock assessment that determines the mortality reduction necessary to end overfishing on the North Atlantic shortfin mako shark stock, domestic reductions of shortfin mako shark mortality alone would not end overfishing of the entire North Atlantic stock. Therefore, NMFS believes that ending overfishing and preventing an overfished status would be better accomplished through international efforts where other countries that have large takes of shortfin mako sharks could participate in mortality reduction discussions. Sections 102 and 304(i) of the Magnuson-Stevens Act encourage this approach, particularly where a species is approaching an overfished condition due to excessive international fishing pressure and there are no management measures to end overfishing under an international agreement to which the United States is a party. The short- and long-term indirect ecological impacts of this action on other pelagic shark species are expected to be neutral, because management measures are expected to be developed explicitly for shortfin mako sharks. While this alternative could have short-term direct, minor, adverse ecological impacts for the portion of the shortfin mako

shark stock that is fished by U.S. fishermen, because current regulations would not change and overfishing would continue, any management recommendations adopted at the international level to end overfishing of shortfin mako sharks could have direct moderate, beneficial ecological impacts on shortfin mako sharks in the long term. Moderate, beneficial, cumulative impacts could be expected from alternative C5, especially if international management measures can end overfishing of shortfin mako sharks.

The approach described in alternative C5 has been utilized in the past in other HMS fisheries, such as establishing rebuilding programs for northwest Atlantic BFT and North Atlantic swordfish. During this rulemaking process, the United States has already begun to engage the international community on shortfin mako management measures. For example, in November 2009, at the Twenty-First regular meeting of ICCAT in Recife, Brazil, the United States submitted a proposal that included measures to conserve shortfin mako sharks, including a measure to cap shortfin mako landings at 2008 levels. The proposal was not adopted, due to differences of opinion among contracting parties as some wanted to exempt shortfin mako sharks taken as bycatch from the proposal. Bycatch of shortfin mako sharks in the pelagic longline fishery is the leading cause of mortality in the ICCAT Convention area, thus this counterproposal was not acceptable. The United States advocated continued consideration of shortfin mako shark measures and its proposal was referred for consideration at the 2010 Annual ICCAT meeting. Under alternative C5, the United States would continue to advocate for the consideration of shortfin mako shark measures.

NMFS prefers alternative C5 at this time because this alternative works towards developing effective international management measures, which would likely result in ending overfishing of the entire North Atlantic shortfin mako shark stock, instead of implementing unilateral domestic management measures, which likely would not result in ending overfishing.

**Table 4.9** Estimates of commercial and recreational landings and dead discards for shortfin mako sharks in the U.S. Atlantic, Gulf of Mexico, and Caribbean. (Source: ICCAT 2009)

Year	Commercial					Recreational			Discards			Total		
	mt (ww) <sup>1</sup>	mt (dw) <sup>2</sup>	lb (dw) <sup>3</sup>	av. weight <sup>4</sup>	number <sup>5</sup>	number <sup>6</sup>	av. weight <sup>7</sup>	lb (dw)	number	mt (ww)	lb (dw) <sup>8</sup>	number	lb (dw)	mt (ww)
1981						7,678	56.395	433,001				7,678	433,001	385
1982						13,522	50.996	689,568				13,522	689,568	613
1983						7,375	51.597	380,529				7,375	380,529	338
1984						15,474	67.531	1,044,975				15,474	1,044,975	929
1985						79,912	41.487	3,315,309				79,912	3,315,309	2,947
1986						20,792	70.107	1,457,665				20,792	1,457,665	1,296
1987						14,809	35.069	519,337			0	14,809	519,337	462
1988						19,998	44.693	893,771			0	19,998	893,771	795
1989						8,367	90.117	754,009			0	8,367	754,009	670
1990						8,509	35.483	301,925			0	8,509	301,925	268
1991						3,422	69.02	236,186			0	3,422	236,186	210
1992				64.400	3,782	8,382	33.589	281,543	437	25.57	28,761	12,601	310,304	276
1993	281.09	143.41	316,164	35.800	4,044	15,034	49.883	749,941	460	19.85	22,327	19,538	1,088,432	968
1994	324.66	165.64	365,177	39.100	4,623	4,496	79.296	356,515	487	18.03	20,280	9,606	741,972	660
1995	288.83	147.36	460,767	52.700	8,743	31,212	51.227	1,598,897	446	28.44	31,989	40,401	2,091,653	1,860
1996	238.05	121.46	427,020	87.000	4,908	8,618	30.265	260,824	0	0.00	0	13,526	687,844	612
1997	245.46	125.23	446,305	44.000	10,143	3,025	60.839	184,038	0	0.00	0	13,168	630,343	560
1998	199.76	101.92	401,491	72.600	5,530	5,633	29.590	166,680	0	0.00	0	11,163	568,171	505
1999	90.05	45.94	217,867	47.000	4,635	1,383	51.597	71,359	0	0.00	0	6,018	289,226	257
2000	166.74	85.07	286,764	44.200	6,488	5,813	51.597	299,934	0	0.00	0	12,301	586,698	522
2001	182.02	92.87	347,844	50.700	6,861	2,827	83.938	237,293	0	0.00	0	9,688	585,137	520
2002	165.59	84.48	314,736	38.900	8,091	3,206	87.152	279,409	0	0.00	0	11,297	594,145	528
2003	140.80	71.84	285,222	40.000	7,131	3,906	35.880	140,147	0	0.00	0	11,037	425,369	378
2004	188.31	96.07	392,628	40.023	9,810	5,052	55.796	281,881	0	0.00	0	14,862	674,509	600
2005	186.03	94.91	341,391	61.576	5,544	3,857	31.204	120,354	0	0.00	0	9,401	461,745	411
2006	129.67	66.16	232,757	37.556	6,198	3,352	53.232	178,434	0	0.00	0	9,550	411,191	366
2007	214.88	109.63	352,905	47.920	7,364	2,556	38.975	99,620	0	0.00	0	9,920	452,525	402
2008	185.25	94.52	289,898	50.713	5,716	1,904	48.318	91,997	0	1.00	1,125	7,620	383,020	341

<sup>1</sup> In whole weight from weighout data sheets; <sup>2</sup> Whole weight to dressed weight conversion ratio is 1.96; <sup>3</sup> 1982-1994 data are from weighout data sheets, 1995-2008 data are the sum of the southeast quota monitoring program/southeast general canvass and the northeast general canvass/dealer weighout data; <sup>4</sup> In pounds dressed weight from the pelagic longline observer program; <sup>5</sup> 1982-1994 data are taken directly from weighout data sheets, 1995-2008 data obtained by dividing values in fourth column (lb dw) by those in fifth column (av. weight); <sup>6</sup> Almost all recreational landings are from the MRFSS survey; <sup>7</sup> In pounds dressed weight; <sup>8</sup> Whole weight to dressed weight conversion ratio is 1.96.

Under alternative C6, the preferred alternative, NMFS would promote the live release of shortfin mako sharks in the commercial shark fishery, but this alternative would not result in any changes to the current commercial regulations regarding shortfin mako sharks. This alternative is expected to have short- and long-term indirect, neutral ecological impacts on other pelagic shark species because the focus of the alternative is explicitly on shortfin mako sharks. Live release of shortfin mako sharks would be voluntary under this alternative and would be promoted using current HMS outreach mediums (*e.g.*, website, email listserv) along with others that have yet to be determined. This alternative would allow NMFS to communicate the current status (overfishing occurring) of the North Atlantic shortfin mako shark stock in the hopes that fishermen would be compelled to reduce commercial fishing mortality to avoid a future change in stock status (overfished), which could lead to more restrictive measures. Hight et al. (2007), estimated post-release survival of shortfin mako sharks caught on PLL gear at approximately 80 percent, although this research was conducted in the Pacific Ocean off California using short soak times (approximately three hours); therefore, it may not represent the post-release survival of North Atlantic shortfin mako sharks caught in the U.S. PLL fishery. This alternative is expected to have slightly beneficial or neutral ecological impacts for shortfin mako sharks because 68.9 percent of shortfin mako sharks are brought to the vessel alive and could be released. This action would not restrict commercial harvest and landing of shortfin mako sharks that are alive at haulback, therefore, this alternative would likely have neutral ecological impacts for this stock since 61.4 percent of shortfin mako sharks that are caught are kept. Cumulative impacts of this alternative combined with other actions are expected to be neutral, because domestic commercial fishing practices would not dramatically change under this alternative. This alternative could have short-term direct, minor adverse ecological impacts because overfishing may initially continue under this alternative. However, this alternative could result in the reduction of fishing mortality of shortfin mako sharks in the long-term by encouraging fishermen to contribute to stopping overfishing and maintaining the shortfin mako population by releasing shortfin mako sharks brought to fishing vessels alive. NMFS prefers this alternative because of the possibility for long-term direct, minor beneficial ecological impacts and commensurate reduction in mortality without implementing unilateral management measures that may have adverse social and economic impacts on the U.S. PLL, and that may do little to improve the condition of this species due to fishing pressure from other countries on the shared North Atlantic shortfin mako stock.

### *Social and Economic Impacts*

Currently, on average, 72.5 mt dw of shortfin mako sharks were commercially landed between 2004 and 2007. Using the median real dollar, ex-vessel price per pound of \$1.59 for meat and \$12.00 for fins, for shortfin mako sharks during the same timeframe, this is equivalent to \$350,039 in average annual gross revenues. Because the No Action Alternative, alternative C1, would not modify or alter commercial fishing practices for shortfin mako sharks or other shark species, it would likely result in short- and long-term direct, indirect, and cumulative neutral economic or social impacts.

Alternative C2 would implement a species-specific quota for shortfin mako sharks at the level of the average annual commercial landings for this species. This alternative is expected to have short-term direct, neutral socioeconomic impacts, because the quota would be set at a level

that reflects the status quo for the shortfin mako shark commercial fishery. In turn, setting a species specific quota would not allow the fishery to grow larger than current average commercial landings, which could lead to long-term direct, adverse socioeconomic impacts. Short and long-term indirect impacts are also expected to be neutral, as implementation of the shortfin mako shark species-specific quota should not change current harvest practices of other species. On average, 72.5 mt dw (159,834 lb dw) of shortfin mako sharks were commercially landed between 2004 and 2007. The average landings weight was then multiplied by the median real dollar, ex-vessel price per pound for shortfin mako shark meat from 2004 to 2007 (\$1.59) to generate estimated annual economic revenues from the meat of shortfin mako sharks of \$254,135. Fin weight was calculated by using the standard fin to carcass ratio of 5 percent dw. Using this ratio, of the 159,834 lb dw of shortfin mako shark landed, approximately 7,992 lb dw would have been shortfin mako shark fins. The fin weight was then multiplied by the median fin price per pound from 2004 to 2007 (\$12.00) to generate estimated annual economic revenues from the fins of shortfin mako sharks of \$95,904. Therefore, the estimated annual revenues for both the meat and fins of shortfin mako shark landings from 2004-2007 is equal to approximately \$350,039. While fishermen would be able to maintain current fishing effort under this alternative, any increase in effort would be restricted by the species-specific quota of 72.5 mt dw. Under the No Action alternative commercial fishermen currently have a 488 mt dw quota, which could potentially be filled entirely by shortfin mako shark landings. Based on the median real dollar, ex-vessel price per pound of \$1.59 for shortfin mako sharks, a quota of 488 mt dw could result in maximum annual revenues equal to \$1,710,593. Thus, if the quota is reduced to 72.5 mt dw, which equals \$254,135 in ex-vessel annual revenues, this could potentially result in a loss of annual revenues of \$1,456,458 for commercial fishermen; however, given that shortfin mako sharks are bycatch in the PLL fishery, it is unlikely that the entire pelagic shark quota would be entirely filled with shortfin mako landings. Though the socioeconomic impacts are expected to be neutral, limiting the U.S. shortfin mako shark harvest to current levels would not have any meaningful impact on ending overfishing of the stock due to substantial and disproportionate levels of harvest by other nations. Therefore, NMFS does not prefer this alternative at this time.

Alternative C3 would remove shortfin mako sharks from the pelagic shark species complex and add them to the prohibited species list. This alternative is expected to have short- and long-term direct, moderate adverse economic impacts for commercial fishermen because shortfin mako landings would be prohibited and the revenues that fishermen get from shortfin mako sharks would be lost. Short- and long-term indirect, socioeconomic impacts of alternative C3 are anticipated to be neutral because this alternative only prohibits retention of shortfin mako sharks, and should not impact retention of other species. Shortfin mako sharks are predominately caught as bycatch in the PLL fishery and, on average, the annual commercial landings for shortfin mako sharks from 2004 to 2007 were 72.5 mt dw. Based on the median real dollar, ex-vessel prices per pound of \$1.59, this is equivalent to \$254,135. However, since shortfin mako sharks would be placed on the prohibited species list under alternative C3, there could be an estimated reduction in annual revenues of \$254,135 to the commercial fishermen. This alternative could lead to increased operation time if commercial fishermen have to release and discard all shortfin mako sharks that are caught on the PLL gear. Also, if the commercial PLL fleet expands in the future, placing shortfin mako sharks on the prohibited species list could result in a loss of future revenues for the commercial PLL fishery. NMFS does not prefer this

alternative at this time because of the associated short- and long-term direct minor adverse socioeconomic impacts, and the lack of any meaningful impact this alternative would have on ending overfishing of the stock due to substantial and disproportionate levels of harvest by other nations.

The potential socioeconomic impacts of implementing alternatives C4a or C4b were assessed by estimating the annual mt dw of shortfin mako sharks that would normally be landed for sale, which would now have to be released under these alternatives. Short- and long-term indirect, socioeconomic impacts of these alternatives are anticipated to be neutral because size limits would apply to shortfin mako sharks only and not the other pelagic shark species. Size limits in alternatives C4a and C4b would restrict the harvest of smaller shortfin mako sharks. To assess the impact of the size limits, NMFS calculated the average dressed weight percentage of shortfin mako sharks retained below each size limit using POP data and then applied that to landings data from the 2008 SAFE Report. Because the POP data is recorded as number of individuals caught, the data were converted into dressed weight by utilizing records of shortfin mako sharks that were recorded as kept and had an associated length measurement in the POP data. Fork lengths were converted into pounds dressed weight, and each conversion was multiplied by the number of sharks kept at each fork length. The dressed weights of individual sharks were then summed to get a total dressed weight for all shortfin mako sharks kept in the PLL and BLL fisheries (*i.e.*, 184,803.1 lb dw).

For alternative C4a, the summed dressed weight of all kept shortfin mako sharks under the proposed 32 inches IDL size limit was 2,550.5 lb dw. This made up 1.4 percent of total dressed weight landings of shortfin mako sharks ( $(2,550.5 / 184,803.1) * 100$ ). This percentage was then applied to the average commercial landings found in the 2008 SAFE Report from 2004-2007 (*i.e.*, 158,884.8 lb dw) to determine the estimated dressed weight of shortfin mako sharks that would be unavailable for landing under alternative C4a ( $158,884.8 \text{ lb dw} * 1.4 \text{ percent} = 2,061.1 \text{ lb dw}$ ) (Table 4.10). The 2,061.1 lb dw of unavailable shortfin mako shark meat was then multiplied by the median real dollar price per pound estimate (\$1.59) for shortfin mako sharks from 2004 to 2007 to generate an estimated annual economic loss of \$3,277. Fin weight was calculated by using the standard fin to carcass ratio of 5 percent dw. Using this ratio, 103 lb of fins would be unavailable for harvest. The unavailable fin weight was then multiplied by the median fin price per pound from 2004 to 2007 (\$12.00) to generate an estimated annual economic loss of \$1,236.00. Economic losses of meat and fins were then summed to calculate a total annual economic loss of \$4,513 under alternative C4a. Given the small magnitude of this loss, lost revenue under alternative C4a is anticipated to have short- and long-term direct, minor adverse socioeconomic impacts.

For alternative C4b, the summed dressed weight of all kept shortfin mako sharks under the proposed 22 inches IDL size limit was 39.7 lb dw. This made up 0.02 percent of dressed weight landings of shortfin mako sharks ( $(39.7 / 184,803.1) * 100$ ). This percentage was then applied to the average commercial landings found in the 2008 SAFE Report from 2004-2007 (158,884.8 lb dw) to determine the estimated dressed weight of shortfin mako sharks that would be unavailable for landing under alternative C4b ( $158,884.8 \text{ lb dw} * 0.02 \text{ percent} = 34.3 \text{ lb dw}$ ) (Table 4.10). The 34.3 lb dw of unavailable shortfin mako shark was then multiplied by the median price per pound estimate (\$1.59) for shortfin mako sharks from 2004 to 2007 to generate

an estimated annual economic loss of \$54.54. Fin weight was calculated by using the standard fin to carcass ratio of 5 percent dw. Using this ratio, 1.72 lb of fins would be unavailable for harvest. The unavailable fin weight was then multiplied by the median fin price per pound from 2004 to 2007 (\$12.00) to generate an estimated annual economic loss of \$20.64. Economic losses of meat and fins were then summed to calculate a total annual economic loss of \$75.18 under alternative C4b. Given the extremely small magnitude of this loss, lost revenue under C4b is anticipated to have short- and long-term direct, minor adverse socioeconomic impacts.

**Table 4.10** Estimates of shortfin mako shark landings (lb dw) reductions according to size restrictions in alternatives C4a and C4b.

Alternative	Size Limit (inches IDL)	Average shortfin mako shark commercial landings (lb dw) from 2004-2007 (2008 Safe Report)	Percentage of total landings (lb dw) of shortfin mako sharks below size limit (POP)	Estimated total weight (lb dw) of shortfin mako shark prohibited.
C4a	32	159,884.75	1.4	2,061.1
C4b	22	159,884.75	0.02	34.3

Alternatives C4a and C4b would both have short- and long-term direct, minor adverse socioeconomic impacts because only a small percentage of commercial landings would be affected by the size restrictions. Of the two alternatives, the adverse economic impact of C4a would be greater, as commercial landings by weight are 2,026.8 lb dw greater than in alternative C4b. Despite these minimum economic impacts, since the size limits would not dramatically reduce fishing mortality of shortfin mako sharks in the commercial sector or have any meaningful impact on ending overfishing of the stock due to substantial and disproportionate levels of harvest by other nations, NMFS does not prefer this alternative at this time.

Under alternative C5, a preferred alternative, NMFS would take action at the international level through international fishery management organizations to establish management measures to end overfishing of shortfin mako sharks. Short- and long-term indirect socioeconomic impacts are expected to be neutral because fishing practices on other species are not expected to change under this alternative. In the short term, this alternative would result in direct, neutral economic and social impacts on commercial fishermen as it would not restrict commercial harvest of shortfin mako sharks, nor alter the pelagic shark quota. Therefore, the short-term, direct, social and economic impacts of alternative C5 would be the same as described in the No Action alternative, alternative C1. However, this alternative could have direct, minor adverse, social and economic impacts in the long-term if management measures were adopted by the United States to implement ICCAT management recommendations that reduce landings domestically for shortfin mako sharks. Given the disproportionately high level of harvest by other nations, adoption of international management measures would be necessary to end overfishing of shortfin mako in the long-term; therefore, NMFS prefers alternative C5 at this time.

Under alternative C6, a preferred alternative, NMFS would promote the release of shortfin mako sharks brought to commercial fishing vessels alive. This alternative would likely result in short- and long-term, direct and indirect, neutral socioeconomic impacts, as it would not restrict commercial harvest of shortfin mako sharks that are alive at haulback, or any other

species, and quotas and retention limits would remain as described in the No Action alternative, Alternative C1. However, as this alternative could result in the reduction of fishing mortality of shortfin mako sharks by encouraging fishermen to release shortfin mako sharks brought to the fishing vessel alive, NMFS prefer this alternative at this time.

### *Conclusion*

Based on the latest ICCAT stock assessment, the United States has determined that shortfin mako sharks are not overfished but are approaching an overfished condition and have overfishing occurring. In comparison to the cumulative fishing mortality on North Atlantic shortfin mako sharks caused by other nations, the minor relative impact of the United States contributes very little to shortfin mako shark mortality in the North Atlantic because there is no directed U.S. commercial fishery for this species. Preventing or limiting U.S. harvest of shortfin mako sharks would not achieve the goal of ending overfishing because of the substantial and disproportionate levels of harvest by other nations, and these restrictions could put U.S. fishermen at a disadvantage relative to foreign competitors. The ICCAT stock assessment did not provide a recommended TAC or mortality reductions to prevent overfishing of shortfin mako sharks, making it difficult to set a quota or other limits to prevent overfishing. Therefore, the preferred alternatives would be to take action at the international level through international fishery management organizations to establish management measures to end overfishing of shortfin mako sharks, and to promote the live release of shortfin mako sharks in the domestic commercial shark fishery. Neither of these two preferred alternatives would change the current commercial regulations for shortfin mako sharks. NMFS believes that ending overfishing and preventing an overfished status would be better accomplished through international efforts where other countries that have large takes of shortfin mako sharks could participate in shortfin mako shark mortality reductions. While this alternative could have neutral or short-term minor adverse ecological and neutral socioeconomic impacts for the portion of the shortfin mako shark stock that is fished by U.S. fishermen, any international management recommendations adopted by the United States to help protect shortfin mako sharks would be implemented domestically. These management measures could have long-term beneficial ecological impacts on shortfin mako sharks and potentially minor adverse socioeconomic impacts on U.S. fishermen in the long-term if adopted measures restrict quotas and fishing practices. Promoting the release of shortfin mako sharks that are brought to commercial fishing vessels alive could result in a reduction in shortfin mako shark mortality and thus, have beneficial ecological impacts for this species. Compared to alternatives C2, C3, and C4, the preferred alternatives would likely not result in any significant adverse socioeconomic impacts as it would not restrict commercial harvest of shortfin mako sharks that are alive at haulback, and commercial quotas and retention limits would remain as described in the No Action alternative.

## **4.2 Recreational Measures**

### **4.2.1 Small Coastal Sharks**

As with the commercial fishery, NMFS is also considering new management measures within the recreational fishery to ensure that blacknose sharks are rebuilt by 2027. On average, from 1999-2005, the recreational fishery landed 10,408 blacknose sharks per year. However, because most blacknose sharks rarely reach the 54 inch FL minimum size limit that is currently

established in federal waters, it is presumed that the majority blacknose shark landings occur within state waters that have smaller size limits than the federal regulations. Regardless of the preferred alternative in this document, NMFS would need to continue working with states to ensure complementary recreational management measures, as well as with the ASMFC through their Interstate FMP for Coastal Sharks, in order to achieve the needed reduction in recreational landings and in order to rebuild blacknose sharks (*i.e.*, at least a 78-percent reduction in landings or total mortality of 2,290 blacknose sharks per year by recreational fishermen). As described in Chapter 2, the alternatives considered for small coastal shark in the recreational fishery are:

Alternative D1	<i>No Action. Maintain the current recreational retention and size limits for SCS - Preferred Alternative</i>
Alternative D2	Modify the minimum recreational size limit for blacknose sharks based on their biology
Alternative D3	Increase the retention limit for Atlantic sharpnose sharks based on current catches
Alternative D4	Prohibit retention of blacknose sharks in recreational fisheries

### *Ecological Impacts*

In the DEIS, the preferred alternative was alternative D4, which would prohibit retention of blacknose shark in the recreational fishery. However, after evaluating public comments on the DEIS and because the status quo minimum size limit of 54 inches acts as a *de facto* retention prohibition, NMFS decided to change the preferred alternative in the FEIS to alternative D1.

Under the preferred alternative, alternative D1, the No Action alternative, NMFS would maintain the existing recreational size and retention limits for SCS. Recreational anglers are currently allowed one authorized shark greater than 54 inches (4.5 ft) FL per vessel per trip (including SCS). In addition, they are allowed one bonnethead shark and one Atlantic sharpnose shark per person per trip. The current recreational harvest of SCS combined from 2004-2007 was 536,886 fish (approximately 33,555 per year). The Atlantic sharpnose shark was the most abundant species caught at a rate of approximately 86,863 per year. The other average yearly harvest rates were approximately 35,165 for bonnethead sharks, 10,360 for blacknose sharks, and 1,834 for finetooth sharks. Because there would be no change to the current retention limits under alternative D1, there would be no direct and indirect ecological impacts in the short- and long-term associated with this alternative. This includes neutral indirect ecological impacts for Atlantic sharpnose, bonnethead, and finetooth sharks, as these species are currently not overfished and overfishing is not occurring. This alternative would also have neutral direct ecological impacts on blacknose sharks, a stock that is considered to be overfished with overfishing occurring. Blacknose sharks rarely reach a size greater than the current federal minimum size; therefore, the 54 inch FL size limit creates a *de facto* retention prohibition of blacknose sharks in federal waters. During the public comment period, NMFS received comments that if NMFS selected alternative D4, that some states may have to prohibit the retention of blacknose sharks in state waters. The comments also stated that because some states have a well managed blacknose recreational fishery, and conservation measures in place to adequately protect this species in state waters, prohibiting their retention was not necessary. However, if some states continue to allow recreational landings of blacknose sharks below the 54 inch FL in state waters this could have direct, minor adverse impacts on blacknose sharks. If

overfishing continues to occur on the blacknose shark stock based on the next assessment, NMFS would ask states to implement measures that are at least consistent with federal regulations to help reduce mortality and meet rebuilding targets for blacknose sharks and, depending on the TAC provided in the stock assessment, may again consider prohibiting recreational retention of blacknose sharks (alternative D4).

Alternative D2 would modify the minimum recreational size for blacknose sharks based on their biology. Currently, the minimum retention size is 54 inches. However, the minimum size was based on the size at which 50 percent of female sandbar sharks reached sexual maturity. Blacknose sharks rarely, if ever, reach 54 inches as a maximum size. Given the difference in sizes for sexual maturity for blacknose and sandbar sharks, such a minimum size may need to be changed. A minimum size for blacknose sharks that corresponds to the size at which 50 percent of the female blacknose sharks reach sexual maturity is 36 inches FL. Thus, if NMFS based a new minimum size for blacknose sharks on the size at which 50 percent of the female blacknose sharks reach sexual maturity, or 36 inches FL, the new restriction would lower the current minimum size for blacknose sharks and could lead to increased landings of blacknose sharks in federal waters. Given shark populations would not respond to a change in size limit in the short-term (*i.e.*, 1-2 years), this alternative would most likely not have any direct and indirect ecological impacts in the short-term. However, based on data from MRFSS, the average length of blacknose sharks landed by recreational anglers was less than 36 inches FL, presumably due to landings in state waters with more liberal minimum sizes. Landings could decrease if states adopted the federal 36 inch FL minimum size in state waters. Thus, overall, landings are not expected to increase by a significant amount in federal waters by implementing this smaller size limit for blacknose sharks, and the smaller size limit could result in direct and indirect, beneficial, minor ecological impacts on blacknose sharks in the long-term. Given the potential increase for landings in federal waters but the decrease of landings in state waters, the cumulative ecological impacts would be neutral. However, in order to achieve the TAC recommended by the 2007 blacknose shark stock assessment, NMFS needs to reduce overall blacknose mortality. Since decreasing the minimum size for blacknose sharks could likely increase the landings of blacknose sharks, NMFS does not prefer this alternative at this time.

Alternative D3 would increase the retention limit for Atlantic sharpnose sharks based on their current catches and stock status. Based on the 2007 stock assessment for Atlantic sharpnose, the biomass for Atlantic sharpnose sharks is falling towards the maximum sustainable yield ( $B_{MSY}$ ) threshold (NMFS, 2007). The direct impacts of increasing the retention limit for Atlantic sharpnose would cause short-term, neutral ecological impacts, since fishermen would be retaining more Atlantic sharpnose sharks and decreasing discards. This would be neutral on the stock since the fishing effort would not be increased in the short-term. The indirect effects would cause short-term, minor, adverse ecological impacts because blacknose sharks would continue to be retained. While the stock is not currently overfished or experiencing overfishing, the latest stock assessment suggests that increasing fishing effort, such as increasing the retention limit of Atlantic sharpnose sharks, could result in an overfished status and/or cause overfishing to occur. Thus increasing fishing effort could cause direct and indirect, moderate adverse ecological impacts in the long-term by resulting in an overfished status and/or overfishing of the stock. Because increasing the retention limit for Atlantic sharpnose could result in increased

fishing effort and result in cumulative, moderate adverse ecological impacts for the stock, NMFS does not prefer this alternative at this time.

Under alternative D4, NMFS would prohibit the retention of blacknose sharks in the recreational fishery. This alternative would have direct and indirect, neutral ecological impacts in the short-term since blacknose sharks rarely exceed the recreational minimum size limit. Prohibiting the retention of blacknose sharks under this alternative would cause long-term, direct, beneficial, minor ecological impacts. Alternative D4 would have long-term, indirect, beneficial, minor ecological impacts because the decrease in fishing effort for blacknose sharks would improve the other SCS species. As discussed under alternative D1, the practical effect of this alternative is the same as alternative D1, the No Action alternative, because blacknose sharks rarely reach a size equal to or greater than the current 54 inch FL minimum size limit. Thus, NMFS does not prefer this alternative at this time.

### *Social and Economic Impacts*

Alternative D1 would likely result in direct, neutral socioeconomic impacts in the short- and long-term, as the No Action alternative would maintain current recreational management measures, including the current retention limits and size limits for blacknose sharks. The indirect, neutral socioeconomic impacts in the short- and long-term would cause the fishing effort for the other SCS to maintain the same. After evaluating public comments from the DEIS, NMFS chose to change the preferred alternative from alternative D4, prohibiting recreational harvest of blacknose shark, to the status quo alternative D1. As previously discussed, NMFS prefers Alternative D1 at this time because blacknose sharks rarely reach a size equal to or greater than the current 54 inch FL minimum size limit. Thus, the practical effect is a *de facto* prohibition of the retention of blacknose shark in the recreational fishery, eliminating the necessity to prohibit this species.

Alternative D2 would modify the minimum recreational size for blacknose sharks based on the biology of blacknose sharks. This would lower the current size limit from 54 inches FL to 36 inches FL, the size at which 50 percent of the female blacknose sharks reach sexual maturity, and have direct, minor, beneficial socioeconomic impacts in the short-term as more blacknose sharks could be landed in federal waters. However, as the blacknose shark stock continues to be overfished, this alternative could have direct, minor, adverse socioeconomic impacts the long-term. According to data from MRFSS, the average length of blacknose sharks landed by recreational anglers is less than 36 inches FL. As such, this alternative could increase the landings of recreationally harvested blacknose sharks in federal waters and, therefore, could have indirect minor, beneficial socioeconomic impacts. Since this alternative could result in the increase of blacknose shark recreational landings and NMFS needs to reduce the number of blacknose shark landings in order to rebuild the stock, NMFS does not prefer this alternative at this time.

Alternative D3 would increase the retention limit for Atlantic sharpnose sharks based on their current catches and stock status. Any increase in the retention limit for Atlantic sharpnose sharks would provide direct, minor beneficial socioeconomic impacts in the short- and long-term, especially if fishermen can keep more sharks. The indirect, minor, beneficial socioeconomic impacts in the short- and long-term would result in more charter trips for

charter/headboats. However, since the latest stock assessment suggests that increased fishing effort could result in an overfished status and/or cause overfishing to occur in the future (NMFS, 2007), NMFS does not prefer this alternative at this time.

Under alternative D4, NMFS would prohibit the retention of blacknose sharks in the recreational fishery. While recreational fishermen would still be allowed to catch blacknose sharks when fishing for other species, they would not be permitted to retain blacknose sharks and would have to release them. Thus, this alternative would cause direct, minor, adverse socioeconomic impacts in the short- and long-term because fishermen would have to discard the blacknose sharks caught. This alternative is expected to have indirect, neutral socioeconomic impacts in the short- and long-term, as the current minimum size limit of 54 inches FL already creates a *de facto* prohibition on blacknose shark retention in federal waters and there should not be an increase in recreational fishing trips for blacknose sharks. After evaluating public comment on the DEIS and because alternative D4 has a similar effect as the No Action alternative, NMFS no longer prefers this alternative in the FEIS.

### *Conclusion*

The preferred alternative, alternative D1, would maintain current recreational management measures, including the current retention and size limits for SCS. Because blacknose sharks rarely reach a size equal to or greater than the current minimum size this effectively prohibits their retention in the recreational fishery. Despite this, recreational landings of blacknose sharks from federal waters continue to occur and therefore outreach would be necessary to educate anglers on federal minimum size restrictions and blacknose shark identification so illegal landings can be avoided. As a result, this could cause minor, adverse ecological impacts for blacknose shark stock. Complementary size limits of 54 inches FL in state waters, which would effectively prohibit the retention of blacknose sharks, would be important in achieving the mortality reduction required to attain the TAC recommended by the latest stock assessment. Alternative D2, which would modify the minimum size limit for blacknose sharks, would not allow NMFS to reduce the mortality of blacknose sharks and achieve the recommended TAC. Increasing the retention limit of Atlantic sharpnose sharks under alternative D3 could lead to overfishing of Atlantic sharpnose sharks in the future. NMFS no longer prefers alternative D4 at this time due to public comments and because alternative D1 has the same practical effect, eliminating the necessity for new management measures and affords adequate protection for blacknose sharks thereby contributing to the rebuilding of this species.

### **4.2.2 Pelagic Sharks**

As described in Chapter 2, the alternatives considered for pelagic sharks in the recreational fishery are:

- |                |   |
|----------------|---|
| Alternative E1 | No Action. Maintain the current recreational retention and size limits for shortfin mako sharks |
| Alternative E2 | Increase the recreational minimum size limit of shortfin mako sharks                            |

- Alternative E2a) Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of female shortfin mako sharks reach sexual maturity or 108 inches FL
- Alternative E2b) Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of male shortfin mako sharks reach sexual maturity or 73 inches FL
- Alternative E3            *Take action at the international level to end overfishing of shortfin mako sharks – Preferred Alternative*
- Alternative E4            *Promote the release of shortfin mako sharks brought to fishing vessels alive – Preferred Alternative*
- Alternative E5            Prohibit landing of shortfin mako sharks in the recreational fishery (catch and release only)

### *Ecological impacts*

Under alternative E1, the No Action alternative, NMFS would maintain the current recreational shark fishing regulations that pertain to shortfin mako sharks established in the 2006 Consolidated HMS FMP. The current bag limit for HMS Angling and HMS Charter/Headboat permit holders is one authorized shark species greater than 54 inches FL per vessel per trip, plus one Atlantic sharpnose and one bonnethead shark per person per trip. According to recreational landings data, on average, 3,682 shortfin mako sharks were landed from 2004 to 2007 (NMFS 2008). Therefore, due to the low number of North Atlantic shortfin mako sharks landed in the U.S. recreational fishery in comparison to the number landed internationally, maintaining the No Action alternative would have short- and long-term direct, minor adverse, ecological impacts, as overfishing may still be occurring on the shortfin mako shark stock. Short- and long-term indirect impacts on other species are expected to be neutral, because the recreational fishery would not change. Cumulatively, this alternative and other actions could have neutral ecological impacts on the North Atlantic shortfin mako shark stock, because domestic recreational fishing practices would not dramatically change.

Alternative E2 would increase the current recreational size limit for shortfin mako sharks. Currently, the recreational size limit for shortfin mako sharks is 54 inches FL. Short- and long-term indirect, ecological impacts of alternative E2 are anticipated to be neutral because this alternative only adjusts size limits for shortfin mako sharks and should not affect current fishing practices for other species. Two size limits have been analyzed for shortfin mako sharks, one based on the estimated size of sexual maturity of females (Alternative E2a) and one based on the estimated size of sexual maturity of males (Alternative E2b). For each alternative, FL estimates of the size at which 50 percent of shortfin mako sharks reach sexual maturity was used from Natanson *et al.*, 2006 (185 cm FL for males and 275 cm FL females, respectively), converted to inches, and rounded to the nearest inch to determine the size limit for each alternative to be analyzed. The size limit in inches for alternative E2a was determined to be 108 inches FL, and the size limit in inches for alternative E2b was determined to be 73 inches FL.

To assess the impacts of alternatives E2a and E2b, NMFS used recreational data obtained from the Large Pelagic Survey (LPS). The LPS data comprised recreational landings of shortfin mako sharks from 2004 to 2008, which is reported as recreational activities that took place

during HMS fishing tournaments (tournament) and independent of HMS fishing tournaments (non-tournament).

The LPS data analysis was conducted according to whether shortfin mako sharks were landed during tournament or non-tournament fishing activities. The total number of shortfin mako sharks recorded as tournament and non-tournament landings were summed (292 and 121 sharks, respectively), along with the number of shortfin mako sharks landed below the current size limit of 54 inches FL (four and 12 sharks, respectively), the number of shortfin mako sharks below the size limit of 108 inches FL in alternative E2a (292 and 119 sharks, respectively), and the number of shortfin mako sharks below the size limit of 73 inches FL in alternative E2b (151 and 98 sharks, respectively). These totals were then used to determine what percentage of tournament and non-tournament recreational shortfin mako shark landings fall below the current recreational size limit, and the two size limits in alternatives E2a and E2b.

According to the LPS tournament data, 1.4 percent of shortfin mako sharks landed were below the current 54 inch FL minimum size, 100 percent were below the 108 inch FL size limit in alternative E2a, and 50.7 percent were below the 73 inch FL size limit in alternative E2b (Table 4.11). Based on non-tournament landings data of shortfin mako sharks, 3.9 percent were below the current 54 inch FL minimum size, 98.3 percent were under the 108 inch FL minimum size in alternative E2a, and 81 percent were under the 73 inch minimum size under alternative E2b (Table 4.11).

**Table 4.11 Percentage of shortfin mako sharks with FL measurements reported as landed to the LPS from 2004 to 2008 under the current size limit and size limits in alternatives E2a and E2b.**

	<b>Total reported recreational shortfin mako landings with FL measurements from 2004-2007</b>	<b>Percentage of recreational shortfin mako landings from 2004-2007 below the current 54 inch FL size limit</b>	<b>Percentage of recreational shortfin mako landings from 2004-2007 below 108 inch FL sizes</b>	<b>Percentage of reported recreational shortfin mako shark landings from 2004-2007 below 73 inch FL sizes</b>
Tournament	292	1.4%	100%	51.7%
Non-tournament	121	9.9%	98.3%	81.0%
Total	413	3.9%	99.5%	60.3%

For alternative E2a, NMFS applied the total 99.5 percent reduction (tournament and non-tournament landings combined) of shortfin mako sharks landed that were below the 108 inch FL size limit to the recreational landings data found in the 2008 SAFE Report to determine the estimated reduction in recreational shortfin mako shark landings under this alternative. According to the recreational landings data, on average 3,682 shortfin mako sharks were landed from 2004 to 2007 (NMFS 2008). Therefore, when applying the 99.5 percent reduction to the average shortfin mako recreational landings, this would result in 3,664 shortfin mako sharks that would have to be released ( $3,682 * 99.5 \text{ percent} = 3,664$ ), and 18 that could be landed under this alternative.

For alternative E2b, NMFS applied the total 60.3 percent reduction (tournament and non-tournament landings combined) of shortfin mako sharks landed that were below the 73 inch FL size limit to the recreational landings data found in the 2008 SAFE Report to determine the estimated reduction in recreational shortfin mako shark landings under this alternative. According to recreational landings data, on average 3,682 shortfin mako sharks were landed from 2004 to 2007 (NMFS 2008). Therefore, when applying the 60.3 percent reduction to the average shortfin mako recreational landings, this would result in 2,220 shortfin mako sharks that would have to be released ( $3,682 * 60.3 \text{ percent} = 2,220$ ), and 1,462 that could be landed under this alternative.

Alternatives E2a and E2b could have long-term direct, minor beneficial ecological impacts on shortfin mako sharks because both alternatives would lead to a large majority of the U.S. recreationally caught shortfin mako sharks to be released alive (99.5 and 60.3 percent, respectively). The reductions in fishing mortality in alternatives E2a and E2b would not have meaningful impact on ending overfishing of the North Atlantic shortfin mako shark stock due to substantial and disproportionate levels of harvest by other nations, and without a recommended TAC the total mortality reduction that is necessary to end overfishing of shortfin mako sharks is unknown. Due to the larger size limit of 108 inches FL, alternative E2a would have 65 percent more shortfin mako shark releases than alternative E2b; therefore, having the greatest long-term direct ecological benefit of these two alternatives. Short-term direct, ecological impacts would be neutral for both alternative E2a and E2b, because any reduction in shortfin mako shark mortality would not be reflected in the population in the short-term due to the life history parameters of the shortfin mako shark. Cumulatively, these alternatives and other actions are expected to have neutral ecological impacts on the North Atlantic shortfin mako shark stock because domestic recreational fishing practices would not dramatically change.

Under alternative E3, a preferred alternative, NMFS would take action at the international level to end overfishing of shortfin mako sharks through participation in international fisheries organizations such as ICCAT. As discussed under alternative C5, ICCAT assumes three shortfin mako shark stocks for assessment purposes: northern and southern Atlantic stocks, separated at 5°N latitude, and a Mediterranean stock. According to ICCAT estimates, U.S. shortfin mako shark annual recreational landings did not exceed 32,000 fish from 1992 to 2008 (Table 4.9). Total shortfin mako shark landing estimates that were attributable to the domestic recreational fishery were slightly higher than the domestic commercial fishery over the same time period (Table 4.9). However, the United States contributes only a minor portion of the mortality for North Atlantic shortfin mako sharks (Table 4.6). Even if NMFS took action to prevent shortfin mako mortality by U.S. recreational fishermen, the shortfin mako shark stock would likely continue to experience overfishing due to substantial and disproportionate levels of harvest by other nations. Also, it is unknown what level of mortality reduction is necessary to end overfishing because the ICCAT stock assessment did not recommend a specific TAC. Therefore, NMFS believes that ending overfishing and preventing an overfished status can only be accomplished through development of management measures at the international level to be adopted and implemented by the United States and other nations. This alternative would not cause an unnecessary disadvantage to domestic recreational fishermen, but would have direct, minor adverse ecological impacts for shortfin mako sharks in the short-term, because there would be no changes to current regulations. In the long-term, any management recommendations

adopted at the international level to end overfishing of shortfin mako sharks could have direct, moderate beneficial, ecological impacts on the North Atlantic shortfin mako shark population if those recommendations reduced overall mortality of shortfin mako sharks. Short- and long-term indirect, ecological impacts of alternative E3 are anticipated to be neutral, because measures in this alternative explicitly address shortfin mako sharks. Cumulatively, this alternative and other actions could have moderate, beneficial, ecological impacts on the North Atlantic shortfin mako shark stock, especially if international management measures end overfishing on shortfin mako sharks. Because of the potential for long-term direct, beneficial ecological benefits on the North Atlantic shortfin mako shark stock, NMFS prefers alternative E3 at this time.

Under alternative E4, a preferred alternative, NMFS would promote the live release of shortfin mako sharks in the recreational shark fishery, but this alternative would not result in any changes to the current recreational regulations regarding shortfin mako sharks. Short- and long-term indirect, ecological impacts of alternative E4 are anticipated to be neutral because management measures and fishing practices would not change. Cumulative impacts of this alternative and other actions are expected to be neutral, because domestic recreational fishing practices would not dramatically change. Recreational shark fishermen would still be able to retain one authorized shark species greater than 54 inches FL per vessel per trip, and one Atlantic sharpnose and one bonnethead shark per person per trip. Shortfin mako sharks caught in the recreational fishery generally have low post-release mortality levels, especially when injuries from hooking and releasing the shark are minimized (Skomal, G., pers. com.). NMFS would encourage the catch and release of live shortfin mako sharks, which is anticipated to have minor, direct, adverse, ecological impacts to the shortfin mako shark stock in the short-term if overfishing continues, but could have direct, minor beneficial, ecological impacts in the long-term if recreational anglers practice catch and release more frequently, which would reduce shortfin mako shark fishing mortality. It is unknown what mortality reduction is necessary to end overfishing because of a lack of a specified TAC from the stock assessment, and even with a reduction in U.S. recreational shortfin mako shark mortality overfishing on the North Atlantic stock is likely to continue because of substantial and disproportionate levels of harvest by other nations. If any management recommendations are adopted at ICCAT to help protect shortfin mako sharks under the preferred alternative E3, NMFS would implement those recommendations domestically. These management measures along with reduced mortalities resulting from promoting the live release of shortfin mako sharks could have beneficial ecological impacts on shortfin mako sharks in the long term. Therefore, NMFS prefers E4 at this time

Alternative E5 would prohibit the landings of shortfin mako sharks in the recreational fishery by placing shortfin mako sharks on the prohibited species list. Short- and long-term indirect, ecological impacts of alternative E5 are anticipated to be neutral because measures in this alternative explicitly address shortfin mako sharks and would not change fishing practices on other species. Shark species can only be added to the prohibited species list provided that two of the following four criteria are met: 1) There is sufficient biological information to indicate the stock warrants protection, such as indications of depletion or low reproductive potential or the species is on the ESA candidate list; 2) the species is rarely encountered or observed caught in HMS fisheries; 3) the species is not commonly encountered or observed caught as bycatch in fishing operations; or 4) the species is difficult to distinguish from other prohibited species (*i.e.*, look-alike issue). The North Atlantic shortfin mako shark stock has been determined to have overfishing occurring based on the 2008 ICCAT stock assessment. In addition, shortfin mako

sharks look similar to other sharks on the prohibited species list (*i.e.*, white sharks, longfin mako sharks). According to recreational landings data, on average 3,682 shortfin mako sharks were landed annually from 2004 to 2007 (NMFS 2008). Because of the small number of shortfin mako sharks taken in the recreational fishery, placing this species on the prohibited species list is expected to have long-term direct, minor beneficial, ecological impacts on the North Atlantic shortfin mako shark stock. It is unknown what mortality reduction is necessary to end overfishing because of a lack of a specified TAC, and even with a prohibition of U.S. shortfin mako shark recreational landings overfishing on the North Atlantic stock is likely to continue because of substantial and disproportionate levels of harvest by other nations. Short-term direct, ecological impacts would be neutral, because any reduction in shortfin mako shark mortality would not be reflected in the population in the short-term due to the life history parameters of the shortfin mako shark. Cumulative impacts of this alternative and other actions are expected to be neutral because domestic recreational fishing practices would not dramatically change, and the United States contributes only a small portion of the overall mortality of North Atlantic shortfin mako shark population.

### *Social and Economic Impacts*

Alternative E1 would likely result in short- and long-term direct, indirect, and cumulative neutral socioeconomic impacts, as the No Action alternative would not substantially modify or alter recreational fishing practices for shortfin mako sharks or other shark species. Under this alternative recreational charters and tournaments would operate under the current regulations governing shortfin mako shark harvest (*e.g.*, size and retention limits), which should not impact revenues generated from the recreational fishery.

Alternative E2a could have short- and long-term direct, moderate, adverse social and economic impacts, as almost all of the reported shortfin mako sharks landed (99.5 percent) were smaller than the 108 inch FL size limit and would have to be released. Therefore, this alternative would create a *de facto* catch and release fishery for shortfin mako sharks. The social and economic impacts of alternative E2b would be less severe than alternative E2a, but would result in a 60.3 percent overall reduction in recreational shortfin mako shark landings. Under alternative E2b, adverse socioeconomic impacts would be greater on the non-tournament recreational shortfin mako shark fishery participants, as 81 percent of non-tournament landings would fall below the 73 inch FL size limit compared to 51.7 percent of tournament landings (Table 4.11). According to LPS data, 41 percent of shortfin mako sharks caught recreationally are kept (Table 4.12); therefore, the size limits considered in alternatives E2a and E2b may have adverse socioeconomic and social impacts on tournament and non-tournament recreational fishery participants by making it more difficult to land a legal sized fish. Both size limits are anticipated to have neutral short- and long-term indirect socioeconomic impacts, because they apply specifically to shortfin mako sharks and would not change recreational fishing practices for other species.

**Table 4.12 Total number of shortfin mako sharks reported to the LPS from 2004 to 2008.**

Year	Kept	Released Alive	Discard Dead	Total
2004	4640	6731	17	11389
2005	2732	3086	7	5825
2006	3639	5485	0	9123
2007	2283	3363	0	5647

<b>Year</b>	<b>Kept</b>	<b>Released Alive</b>	<b>Discard Dead</b>	<b>Total</b>
2008	2348	3524	0	5872
Total	15643	22189	24	37856
Average	3129	4438	5	7571
% of Average	41%	59%	0%	100%

Under alternative E3, NMFS would take action at the international level to end overfishing of shortfin mako sharks. This alternative would not result in any changes to the current recreational regulations regarding bag or size limits for shortfin mako sharks. Therefore, no changes would initially be made to the recreational fishery and this alternative would likely result in direct, neutral social or economic impacts for recreational fishermen in the short-term. Management measures to address overfishing of shortfin mako sharks could be adopted in the future. These measures could change the way that the U.S. recreational shortfin mako shark fishery operates, which could cause long-term direct, moderate adverse socioeconomic impacts. Implementation of management measures that would significantly alter the way tournaments and charter vessels operate, or reduce opportunity and demand for recreational shortfin mako shark fishing, could create adverse socioeconomic impacts. Any future action to implement international measures would be analyzed in a separate rulemaking. Neutral short- and long-term indirect socioeconomic impacts are anticipated because international management measures would specifically address shortfin mako sharks and would not interfere with current operations of other recreational fisheries.

Under alternative E4, NMFS would promote the live release of shortfin mako sharks in the recreational shark fishery, but this alternative would not result in any changes in the current recreational regulations regarding bag or size limits for shortfin mako sharks. Therefore, this alternative would likely result in short- and long-term direct, neutral social or economic impacts, because the U.S. shortfin mako shark fishery would not change operationally. Under this alternative recreational charters and tournaments would operate under the current regulations governing shortfin mako shark harvest (*e.g.*, size and retention limits), which should not impact revenues generated from the recreational fishery. This alternative is also expected to have short- and long-term indirect, neutral socioeconomic impacts, as it would not change operations of other recreational fisheries.

Under alternative E5, NMFS would remove shortfin mako sharks from the authorized species list and place them on the prohibited species list. Placing shortfin mako sharks on the prohibited species list would result in a recreational catch and release fishery for this species. According to recreational landings data, on average 3,682 shortfin mako sharks were landed from 2004 to 2007 (NMFS 2008). Although a small number of shortfin mako sharks were landed in the recreational fishery during this time period, it is also an important shark species in fishing tournaments. Fishing tournaments are an important component of HMS recreational fisheries. In 2007, there were 42 shark tournaments throughout the U.S. Atlantic, including the Gulf of Mexico and the Caribbean Sea. Therefore, compared to the alternatives discussed above, adding this species to the prohibited species list could have short- and long-term direct, moderate adverse social and economic impacts for recreational fishermen and those who participate in recreational shark tournaments that would no longer be able to retain shortfin mako sharks, as these tournaments may not be able to continue traditional operations. Neutral, indirect, short-

and long-term socioeconomic impacts resulting from alternative E5 are expected because operations of other recreational fisheries would not change.

### *Conclusion*

NMFS has determined that shortfin mako sharks are not overfished but have overfishing occurring based on the latest ICCAT stock assessment. Relative to other ICCAT Contracting Parties, the United States contributes very little to shortfin mako shark mortality in the North Atlantic because there is no directed commercial fishery and recreational landings are estimated to be similar to commercial landings. The ICCAT stock assessment did not provide a recommended TAC necessary to rebuild North Atlantic shortfin mako sharks, making it difficult to set a quota that would aid in rebuilding this species. Therefore, the preferred alternatives at this time would be to take action at the international level through development of management measures to end overfishing of shortfin mako sharks and to promote the live release of shortfin mako sharks in the recreational shark fishery. Neither of the two preferred alternatives, E3 and E4, would change the current domestic recreational regulations for shortfin mako sharks. NMFS believes that ending overfishing and preventing an overfished status may be better accomplished through international efforts where other countries that have large takes of shortfin mako sharks could participate in shortfin mako shark mortality reductions. While this alternative would have neutral ecological and socioeconomic impacts for the portion of the shortfin mako shark stock that is fished by U.S. fishermen in the short term, any international management recommendations adopted to help protect shortfin mako sharks would be implemented domestically and could have moderate beneficial ecological impacts on shortfin mako sharks in the long term and potentially moderate adverse social and economic impacts on U.S. fishermen. Promoting the release of shortfin mako sharks that are brought to the vessel alive could result in the reduction of fishing mortality of shortfin mako sharks and thus, have short- and long-term direct, minor beneficial ecological impacts for this species. Compared to alternatives E2 and E5, the preferred alternatives would likely not result in any short-term adverse social or economic impacts on fishery participants as it does not restrict recreational harvest of shortfin mako sharks that are brought to the vessel alive, and recreational size limits and retention limits would remain as described in the No Action alternative.

### **4.3 Smooth Dogfish**

NMFS currently manages sharks in four management units (small coastal sharks, pelagic sharks, large coastal sharks, and prohibited species). There are additional species of sharks that are HMS and that fall outside of the current management units. The management of these species remain under Secretarial authority should the Secretary determine the species is in need of conservation and management. One of these species, smooth dogfish, is not currently managed at the federal level. Although smooth dogfish were previously included in a fishery management unit (FMU) that included deepwater and other sharks in order to prevent finning, these species were removed from the FMU in the 2003 Amendment 1 to the Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks since they were protected from finning under the Shark Finning Prohibition Act (67 FR 6124, February 11, 2002). The Magnuson-Stevens Act is the primary statute giving fishery management authority to NMFS, on behalf of the Secretary of Commerce. The Magnuson-Stevens Act also provides authority for the Regional Fishery Management Councils to manage stocks and species within each Council's

geographic jurisdiction due to the Council's close cooperation with constituents, fishery experience and knowledge, and consensus building process. One exception to this management authority is for Atlantic HMS, which are managed solely under NMFS, on behalf of the Secretary of Commerce. As detailed below, NMFS has determined that smooth dogfish falls within the congressional directive regarding HMS and should be managed under the Secretary's authority.

Before and during the public comment period for the DEIS and the proposed rule, NMFS received several suggestions that the management of smooth dogfish should be given to the Regional Fishery Management Councils. NMFS disagrees (see Appendix C). The Magnuson-Stevens Act Section 3 (21) defines HMS. Unlike other HMS, sharks are not defined by family or species. Rather, the term "oceanic shark" is used. The statute does not further expound upon or define this term. Furthermore, NS3 requires that, to the extent practicable, an individual stock of fish should be managed throughout its range and Section 302 (3) states that the Secretary shall have authority over any HMS fishery that is within the geographical area of authority of more than one of the five Atlantic Councils. As described in Chapter 11, based on distribution maps provided in Compango (1984), smooth dogfish are found along the eastern seaboard of the United States from Massachusetts to Florida, in the Gulf of Mexico, and in the Caribbean Sea. Their distribution further extends outside the U.S. EEZ to the northern South American coast. Based on scientific surveys and recreational and commercial landings, NMFS has verified that smooth dogfish are found in each of the five Atlantic Regional Fishery Management Council regions. While the primary fishery occurs in the mid-Atlantic region, the species is currently caught in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea, and fishing effort on smooth dogfish could expand in these other regions. Given the wide distribution and range of smooth dogfish and the sections of the Magnuson-Stevens Act noted above, NMFS has determined that smooth dogfish is an oceanic shark, and therefore, because it meets the definition of HMS, the species should be managed by NMFS on behalf of the Secretary.

NMFS determined that conservation and management of smooth dogfish under the Magnuson-Stevens Act is warranted in order to collect data regarding the fishery, fishing effort, and life history of the species. First, a number of stakeholders have indicated that management of smooth dogfish is necessary. These include environmental organizations that have specifically requested management action, the ASMFC that included smooth dogfish in its management unit when finalizing its Interstate FMP for Coastal Sharks, and the MAFMC that specifically requested management authority to manage the smooth dogfish fishery. These efforts by the ASMFC and the MAFMC reinforced the request from environmental organizations that the fishery is in need of conservation and management.

Second, based on existing data, it is apparent that the smooth dogfish fishery is substantial and thus requires sound science-based conservation and management to provide for the long-term sustainable yield of the stock. The smooth dogfish fishery has significant annual landings with a large directed component. Even though landings of the species are likely underreported, the average annual landings of 431 mt dw is among the highest for any species of shark managed by NMFS, eclipsed by only sandbar and blacktip shark landings prior to implementation of Amendment 2. As is common in other elasmobranchs, smooth dogfish are slow to reproduce (see Chapter 11) and, therefore, could be vulnerable to stock collapse in the

face of unrestricted fishing. NMFS needs to collect reliable data concerning the status of the stock to guide development of conservation and management measures, if necessary and appropriate, to meet the requirements of the Magnuson-Stevens Act.

Third, the vast majority of the smooth dogfish catch occurs with gillnets. Some gillnet fisheries in the Atlantic are defined as a Category I fisheries under the Marine Mammal Protection Act (MMPA), meaning the annual mortality and serious injury of one or more marine mammal stocks in a given fishery is greater than or equal to 50 percent of the Potential Biological Removal (PBR) level. While all fisheries need to comply with the requirements of the MMPA regardless of management status, it is easier to ensure the affected fishermen are engaged in the process if their fishery is consistently managed in accordance with uniform conservation and management measures developed and implemented through an FMP in accordance with the procedures in the Magnuson-Stevens Act.

Lastly, the smooth dogfish market could overlap with that of spiny dogfish, which is a species that is federally managed with a significant directed fishery. Spiny dogfish required restrictive management measures in the late 1990s and early 2000s to deal with domestic overfishing. While domestically spiny dogfish stocks appear to be healthy, other stocks internationally are overfished. Because of the possible overlap in markets, NMFS is concerned that smooth dogfish products can be used as a substitute for spiny dogfish products. If there is market overlap, then declines in spiny dogfish stocks (as is seen internationally) and restrictive management measures (including domestic management) could push, or might have already pushed, effort into the smooth dogfish fishery. Until initial management measures are in place to collect data concerning location, effort, and the status of the stock, NMFS will not be able to determine whether further prescriptive conservation and management through future FMP amendments and/or regulatory changes are necessary due to the influence of the foregoing and other relevant factors.

Additionally, NMFS has determined that any management measures implemented for smooth dogfish should also apply to Florida smoothhounds (*Mustelus norrisi*). Emerging molecular and morphological research indicate that Florida smoothhounds may have been misclassified as a separate species from smooth dogfish (Jones, pers. comm.). Additionally, the SEFSC advised that there is insufficient data at this time to separate smooth dogfish and Florida smoothhound stocks, and that they should be treated as a single stock until scientific evidence indicates otherwise. Because of this taxonomic correction and based on SEFSC advice, NMFS is considering Florida smoothhounds to be a smooth dogfish and all smooth dogfish management measures described below, such as permit requirements and quotas, would also apply to Florida smoothhounds.

While there are no data regarding stock status and data on participants in the fishery are sparse, a number of sources exist that document smooth dogfish landings. Despite the lack of management, many fishermen in the mid-Atlantic region have been reporting their landings. Some of these fishermen have federal permits for other species and are required to report all landings, including smooth dogfish, due to the regulations in those other fisheries. Other fishermen do not have federal permits and report smooth dogfish landings voluntarily. These landings, and the number of vessels reporting these landings, have remained fairly constant since

the late 1990s. Existing sources, particularly the Atlantic Coastal Cooperative Statistics Program (ACCSP) for commercial catches and the Marine Recreational Fishing Statistics Survey (MRFSS) (now known as MRIP) for recreational catches, offer insight into the current state of the fishery. A third source, NMFS' Science and Technology's (S&T) Annual Commercial Landings Statistics, available on the S&T webpage (<http://www.st.nmfs.noaa.gov>), is also available, however this system only contains non-confidential landings data, and, thus, underestimates commercial landings. For this reason, ACCSP data were used instead of S&T data for analysis.

As described in Chapter 2, NMFS still prefers alternative F2 in the FEIS. As noted above, NMFS has determined, based on several factors, that smooth dogfish may require conservation and management pursuant to the Magnuson-Stevens Act. Therefore, the alternatives considered for smooth dogfish management are:

- Alternative F1            No Action. Do not add smooth dogfish under NMFS management at this time
- Alternative F2            Add smooth dogfish under NMFS management and establish a federal permit requirement - Preferred Alternative*
  - Alternative F2a1)        Establish a smooth dogfish quota that is equal to the average annual landings from 1998-2007 (950,859 lb dw)
  - Alternative F2a2)        Establish a smooth dogfish quota equal to the maximum annual landing between 1998-2007 (1,270,137 lb dw)
  - Alternative F2a3)        Establish a smooth dogfish quota equal to the maximum annual landing between 1998-2007 plus one standard deviation (1,423,728 lb dw)
  - Alternative F2a4)        Establish a smooth dogfish quota equal to the maximum annual landings from 1998-2007 plus two standard deviations (1,577,319 lb dw) – Preferred Alternative*
  - Alternative F2b1)        Establish a separate smooth dogfish set-aside quota for the exempted fishing program of 6 mt ww – Preferred Alternative*
  - Alternative F2b2)        Establish a smooth dogfish set-aside quota for the exempted fishing program and add it to the current 60 mt ww set-aside quota for the exempted fishing program
- Alternative F3            Add smooth dogfish under NMFS management and mirror management measures implemented in the ASMFC Interstate Shark FMP

*Ecological Impacts*

The No Action alternative, alternative F1, is not anticipated to have any short-term, direct ecological impacts to the stock compared to the status quo. Current fishing levels are not anticipated to impact the stock within the next year or two. However, alternative F1 would not prevent landings from increasing and would not result in data collection on the numbers of participants in the fishery and catch and effort information. These data could be used to characterize the fishery and determine stock status for smooth dogfish. Given this, in the long-term, if current fishing effort is putting too much pressure on the stock, long-term, direct,

moderate adverse ecological impacts could occur as landings would continue to go undocumented or potentially increase under the No Action alternative. Indirectly, no ecological impacts are anticipated in the short-term as impacts to habitat or other species are not anticipated to be affected in the next year or two by current landings of smooth dogfish. However, in the long-term, moderate adverse ecological impacts could occur if EFH is being disturbed by fishing gears but no mitigating measures are taking place. Without federal management, no EFH would be designated. In addition, species identification could be compromised if smooth dogfish are processed at sea with fins removed. This could impact the quality of future stock assessment as well as result in other shark species potentially being finned. As noted above in the introduction to Section 4.3, the need for management exists due to the significant directed component of the fishery, potential marine mammal interactions, and possible market overlaps with spiny dogfish. For these reasons, NMFS does not prefer alternative F1 at this time.

Alternative F2, the preferred alternative, would implement federal management measures for smooth dogfish, such as a requirement to carry an observer if selected and establish a permit requirement for commercial and recreational retention of smooth dogfish in federal waters. At this time, this alternative would not require commercial fishermen to attend the protected species release, disentanglement, and identification workshops. As NMFS gathers information about the fishery and the fishermen, NMFS may decide to require fishermen attend these workshops as is required in other HMS longline and gillnet fisheries. Additionally, at this time, NMFS would not implement a recreational minimum size or retention limit as is required in other shark fisheries. As NMFS gathers more information about the fishery and the fishermen, NMFS may decide to implement such measures. Management measures, including the federal permit requirement, would not be implemented until before the opening of the 2012 smooth dogfish fishing season to allow fishermen time to determine how they could comply with the regulations, and to provide NMFS time to identify where permits would be issued and notify interested fishermen. These management measures would focus on characterizing the fishery in terms of permitting the universe of fishermen (both commercial and recreational) that retain smooth dogfish in federal waters and collecting landing data through dealer reports. While NMFS does not intend to change catch levels or rates while characterizing the fishery, NMFS recognizes that some of the changes, namely requiring fins remain attached to the carcass, would likely have a significant impact on how the fishery operates and could result in changes in catch levels and rates. This alternative would likely have short-term, direct, minor, beneficial ecological impacts on smooth dogfish if the requirement of a federal permit and/or the requirement to keep fins attached reduces the number of participants in the fishery. In the long-term, the ecological impacts could also be direct, minor and beneficial if fishing effort does not increase and landings data are collected to better characterize the fishery and the stock. If the fishery moves fishermen exclusively into state waters as a result of these measures, there is a potential for a variety of adverse or beneficial ecological impacts depending on the life history of the species and its migratory pattern. In the future, NMFS may likely implement additional management measures for smooth dogfish, such as reporting requirements by fishermen or additional measures if warranted by future stock assessments. Despite the benefits of assessing the stock using data reported from vessels, NMFS would likely not implement vessel logbooks or other reporting requirements for smooth dogfish fishermen until the universe of fishermen is known and the appropriate mechanism of reporting without duplicating current reporting requirements can be determined.

In the short-term, no indirect ecological impacts are anticipated under alternative F2 as impacts to habitat or other species are not anticipated to be affected in the next year or two by a permit requirement fins-attached requirement for smooth dogfish. However, alternative F2 could result in long-term indirect, moderate beneficial ecological impacts for other shark species. This alternative would require fins remain naturally attached to the smooth dogfish carcass. NMFS' shark regulations require all sharks caught in federal waters or by vessels holding an HMS permit, commercial and recreational, to be landed with fins naturally attached. This requirement for smooth dogfish would close a potential loophole to the ban on shark finning and allow for better shark identification, which could benefit future stock assessments. Detached smooth dogfish fins can be difficult to differentiate from other shark fins, particularly if there are a large number of fins involved. Furthermore, smooth dogfish carcasses that have been dressed and have the fins removed can be confused with some juvenile LCS, spiny dogfish, and some SCS. Additionally, during the proposed rule portion of this rulemaking, NMFS heard that many smooth dogfish fishermen fully process smooth dogfish on board the vessel, removing not only the fins but also the skins and filleting the carcass. Alternative F2 would prevent that practice of filleting from continuing. As described under Alternative F3, processing smooth dogfish into fillets would also be affected if NMFS was fully consistent with the ASMFC Coastal Shark FMP. Alternative F2 could have many potential ecological benefits for various species of sharks such as juvenile LCS, SCS, and spiny dogfish, all of which, as fillets, could be easily confused with smooth dogfish fillets. The no-processing requirement has been required and clarified many times in the current shark fisheries in order to aid in the enforcement of the shark regulations and aid in rebuilding overfished shark stocks. Continuing that requirement in the smooth dogfish fishery would remove potential loopholes and would benefit all species of sharks. Internationally, the United States and NMFS have advocated for a fins-attached policy in all shark fisheries world-wide. The shark fins-attached policy simplifies enforcement efforts and better protects all shark stocks from finning. Implementing shark fins-attached regulations across all federal shark fisheries strengthens the U.S. position and would help in international negotiations, further protecting other shark species.

Impacts of a commercial federal smooth dogfish permit and fins-attached requirement may have mixed short- and long-term indirect impacts on other species depending on how fishermen respond to the new management measures. If fishermen choose to avoid a federal permit requirement and fish exclusively in state waters, then increased gillnet effort in state waters could have short-term, indirect, minor adverse impacts on other species by catching juvenile fish, which tend to occur in more nearshore waters. In the long-term, these impacts could be moderately adverse if juveniles are taken over longer periods of time affecting multiple year classes. However, if these regulations result in fishermen leaving the smooth dogfish fishery, then reduced gillnet effort could have indirect, minor beneficial ecological impacts for other species in both the short and long term. If fishermen choose to remain in the fishery and obtain a federal commercial or recreational permit, the short-term and long-term, direct and indirect impacts are anticipated to be neutral as the fishery is currently occurring with no permit requirements in place and is open access as it would be under a federal permit requirement. Fishermen could enter the fishery commercially or recreationally, and there would be change in the ecological impacts compared to the status quo.

The EFH identified and described for smooth dogfish outlined as part of this alternative would most likely have no indirect ecological impacts in the short term as identification of EFH does not create any regulatory change for the species. However, in the long-term, this could result in indirect, moderately beneficial ecological impacts because other agencies would have to consult with NMFS and consider conservation recommendations to avoid adverse effects to EFH. The designation satisfies a statutory requirement, and no management measures are associated with its designation. In the 2006 Consolidated HMS FMP and Amendment 1 to the 2006 Consolidated HMS FMP, NMFS reviewed the various gear types with the potential to affect EFH of HMS and other species, and, based on the best information available at this time, NMFS has determined that fishing is not likely to adversely affect EFH for smooth dogfish. Authorized gear types for HMS fishing that contact the ocean floor include sink gillnets and BLL. Sink gillnets are only used over non-complex bottom types such as sand and mud and are not likely to damage or alter the substrate. Thus any impacts from gillnet gear would be minimal and only temporary in nature. In the FEIS for Amendment 1 to the 2006 Consolidated HMS FMP, NMFS determined that shark BLL gear does not have adverse effects on EFH. Based on these conclusions, NMFS has decided that it is not necessary to develop management measures to mitigate adverse impacts to EFH for smooth dogfish. The EFH designated in the FEIS incorporates more smooth dogfish observation points than that which was proposed for smooth dogfish EFH in the DEIS. Since the publication of the DEIS, the NEFSC identified several sources of data to strengthen the EFH determination. These data are concentrated in the northeast United States, and details can be found in Chapter 11.

Gillnets are the primary gear type in the smooth dogfish fishery and under federal management, fishermen using gillnets to target smooth dogfish would be required to comply with federal marine mammal take reduction programs mandated in the Marine Mammal Protection Act at 50 CFR 229.32. These regulations and the associated Take Reduction Plans are specific to the region where gillnets are fished. The Take Reduction Plans include the Atlantic Large Whale Take Reduction Plan, the Bottlenose Dolphin Take Reduction Plan, and the Mid-Atlantic Harbor Porpoise Take Reduction Plan.

Inline with NMFS' intention to minimize changes to the fishery, fishermen would be allowed to harvest smooth dogfish with trawl gear at incidental levels only. Smooth dogfish incidentally caught in trawl gear would be allowed to be retained to minimize any dead discards, however, no management measures for trawl gear would be implemented except for the need for trawl fishermen to obtain a smooth dogfish permit and catch smooth dogfish at incidental levels only. Rather, all trawl gear management will continue to be covered under the targeted species' FMP and the associated BiOp.

As described in Chapter 1, on January 16, 2009, NMFS published the final NSG1 (74 FR 3178) implementing, among other things, ACL and AM requirements of the Magnuson-Stevens Act 16 U.S.C. §1853(a)(15). Per NSG1, ACLs and AMs apply to all species in a federally managed fishery under the Magnuson-Stevens Act unless otherwise exempted. Because smooth dogfish are not subject to an exemption from the statutory requirement, NMFS must establish an ACL and AMs for smooth dogfish if it is incorporated in this amendment. Amendment 3 to the 2006 Consolidated HMS FMP includes a "mechanism" for establishing ACLs, including those for smooth dogfish. This mechanism is described more fully in Chapter 1. The six alternatives

under alternative F2 would implement a smooth dogfish commercial quota and a set-aside quota for smooth dogfish to be taken under the exempted fishing program. Each alternative aims to set a quota around current catch levels of smooth dogfish to minimize restrictions on the current fishery. During the public comment period, NMFS received numerous comments that the proposed quota does not adequately account for underreporting. Several states provided state data that also indicated the sources NMFS used may be underreporting actual landings. Based on these comments and SEFSC advice, NMFS has decided to deviate from the preferred alternative in the DEIS and is now preferring a quota equal to the annual maximum landings plus two standard deviations, or 1,577,319 lbs dressed weight. NMFS believes that setting the quota at a level that accounts for current landings does not threaten smooth dogfish stocks.

Alternative F2a1 would establish a smooth dogfish quota that is equal to the average annual landings from 1998-2007 or 950,859 lb dw. In the short-term, this is not anticipated to have any direct ecological impacts as the population is not expected to respond to lower catch rates within a year or two. In the long-term, this alternative could have direct, moderate beneficial ecological impacts on the stock by capping effort at the average level of landings. Indirectly, such a quota is not anticipated to have any impacts in the short-term as implementing a lower quota based on average landings is not anticipated to impact habitat or other ecosystem components (*i.e.*, predator/prey relationships). Implementing such a quota in the long-term may result in indirect, minor beneficial impacts as reducing overall fishing effort would ensure smooth dogfish remains a viable component of the ecosystem. However, such a quota could be overly restrictive to the fishery. Although NMFS received a comment that this lower quota would be more appropriate due to its unknown stock status, NMFS does not prefer this alternative at this time because it is overly restrictive on the fishery at this time with no stock assessment available in smooth dogfish.

Alternative F2a2 would establish a smooth dogfish quota equal to the maximum annual landing between 1998-2007 or 1,270,137 lb dw. Similarly to alternative F2a1, in the short-term, this is not anticipated to have any direct ecological impacts as the population is not expected to respond to slightly lower catch rates within a year or two. In the long-term, this alternative could have direct, minor beneficial ecological impacts on the stock by capping effort at the maximum reported level of landings, thus not allowing landings to increase. Indirectly, such a quota is not anticipated to have any impacts in the short-term as implementing a slightly lower quota based on maximum landings is not anticipated to impact habitat or other ecosystem components (*i.e.*, predator/prey relationships). Implementing such a quota in the long-term may result in indirect, minor beneficial impacts as capping fishing effort would help ensure smooth dogfish remains a viable component of the ecosystem. However, this quota could also be overly restrictive to the fishery due to underreporting, and therefore, NMFS does not prefer this alternative at this time.

Alternative F2a3, would have similar ecological impacts to the previous two alternatives by capping total landings. In the short-term, this is not anticipated to have any direct ecological impacts as the population is not expected to respond in the next year or two to essentially the same catch rates that have been occurring over the past ten years. In the long-term, this alternative could have direct, minor beneficial ecological impacts on the stock by capping effort and thus not allowing landings to increase. Establishing a smooth dogfish quota equal to the maximum annual landing between 1998-2007 plus one standard deviation (1,423,728 lb dw),

could maintain the quota near historical landing levels. Indirectly, such a quota is not anticipated to have any impacts in the short-term as it is not anticipated to impact habitat or other ecosystem components (*i.e.*, predator/prey relationships). Implementing such a quota in the long-term may result in indirect, minor beneficial impacts as capping fishing effort would help ensure smooth dogfish remains a viable component of the ecosystem. However, based in part on public comment, as detailed below, NMFS does not believe that this alternative would adequately account for underreporting.

Finally, alternative F2a4, the preferred alternative, was added to the FEIS by NMFS after the DEIS public comment period. Based on some of the public comment received and input from the SEFSC, NMFS believes that this new preferred alternative better reflects the intent of the previous preferred alternative, and remains within the range of considered alternatives. As stated in the purpose and need, the smooth dogfish management measures are designed to collect data while minimizing changes in catch levels and catch rates in the fishery. To achieve this goal, it is important to ensure that the smooth dogfish quota is set at a level that allows current fishing practices to continue. Multiple commenters stated that the proposed smooth dogfish quota was too low, and the SEFSC offered that two standard deviations, rather than one, above the maximum annual landings would better account for underreporting. Ecological impacts of this alternative are expected to be similar to the previous three alternatives. Establishing a smooth dogfish quota equal to the maximum annual landing between 1998-2007 plus two standard deviation (1,577,319 lb dw), would maintain the quota near historical landing levels. The two standard deviation buffer would ensure that the fishery is not unnecessarily restricted while also ensuring that effort does not increase significantly until a stock assessment is conducted. In the short-term, this alternative is not anticipated to have any direct ecological impacts as the population is not expected to change in the next year or two in response to keeping landings the same as they have been during the last 10 years. In the long-term, this alternative could have direct, minor beneficial ecological impacts on the stock by capping effort and thus not allowing landings to increase. This alternative is not meant to be much different from the No Action alternative, alternative F1, however, fishing effort would be capped at current levels until more data is available for an assessment of the stock. Setting the quota above current landings levels should allow the fishery to continue, rather than be closed, allowing for NMFS to collect more information that can be used in a future stock assessment. Indirectly, such a quota is not anticipated to have any impacts in the short-term as implementing a quota based on maximum landings plus two standard deviations is not anticipated to impact habitat or other ecosystem components (*i.e.*, predator/prey relationships), and would essentially keep landings at their current rate. Implementing such a quota in the long-term may result in indirect, minor beneficial impacts as capping fishing effort would help ensure smooth dogfish remains a viable component of the ecosystem. For this reason, NMFS prefers alternative F2a4. NMFS would also account for underharvest and overharvest of smooth dogfish as it does for other shark species and would close the smooth dogfish shark quota with five days notice upon filing in the Federal Register when the smooth dogfish shark quota reaches or is projected to reach 80 percent. Closing at this time would help prevent overharvest from occurring while still giving the public 5 days notice that the fishery would close.

Alternative F2b1, the preferred alternative, would establish a separate smooth dogfish set-aside quota for the exempted fishing program. Currently, there is a 60 mt ww set-aside quota

for sharks for the exempted fishing program. However, as smooth dogfish have not been federally managed in the past, smooth dogfish were not included in this 60 mt ww set-aside. Thus, to allow fishermen to take smooth dogfish for research purposes and outside of any established regulations for smooth dogfish, NMFS would establish a separate set-aside for smooth dogfish based on the maximum yearly smooth dogfish takes during research over the past 10 years or 6 mt ww (4.3 mt dw). NMFS derived this estimate of 6 mt ww by asking NMFS scientists, academics, and state scientists who currently conduct research on smooth dogfish to estimate their current take of smooth dogfish under research. Based on this estimate, NMFS would establish a 6 mt ww set aside quota for smooth dogfish taken under scientific research. The set-aside would not be expected to have any direct or indirect short- or long-term ecological impacts given the extremely small size of the set aside quota. These takes are already occurring; however, they are extremely small compared to what the reported take of smooth dogfish is under the current commercial fishery (on average, 431.1 mt dw). In addition, by establishing a separate set-aside for smooth dogfish, there would be no adverse ecological impacts on other shark species taken under the exempted fishing program, as they would be limited to the current 60 mt ww set-aside.

Under alternative F2b2, NMFS would establish a smooth dogfish set-aside quota for the exempted fishing program and add it to the current 60 mt ww set-aside quota for the exempted fishing program. As explained under alternative F2b1, smooth dogfish are not included in the current 60 mt ww set-aside quota for sharks for the exempted fishing program. Thus, the inclusion of smooth dogfish under the exempted fishing program shark quota set-aside would allow fishermen to take smooth dogfish for research purposes and for purposes outside of any established regulations for smooth dogfish. NMFS would establish a set-aside for smooth dogfish based on the maximum yearly smooth dogfish takes during research over the past 10 years or 6 mt ww, and add it to the existing 60 mt ww research set-aside for a total of 66 mt ww. The set-aside would not be expected to have any direct, adverse ecological impacts on smooth dogfish in the short-term as these takes are already occurring and are extremely small compared to what is taken in the commercial fishery. However, in the long-term, if the research set aside was not constrained to 6 mt ww, and smooth dogfish were added into the general shark research and display quota of 60 mt ww, then a potential for 66 mt ww of smooth dogfish could occur under the least conservative scenario. This could have minor adverse ecological impacts if it happened consistently over a long period of time. In addition, increasing the overall 60 mt ww shark quota set-aside to allow the inclusion of smooth dogfish (for a total of 66 mt ww), could allow the increased take of other shark species. While an increase of 6 mt ww would most likely result in no indirect ecological impacts in the short-term for these species, it could result in indirect, minor adverse ecological impacts to certain species that are either prohibited and/or overfished and experiencing overfishing, such as dusky sharks, if increased take occurred over long periods of time under the exempted fishing program. As such, NMFS would need to monitor the number of smooth dogfish and other species of sharks allocated to research programs to ensure there is no increased mortality of other shark species under the exempted fishing program. For this reason, NMFS does not prefer alternative F2b2 at this time.

Alternative F3 would also implement federal management measures for smooth dogfish. Under this alternative, NMFS management measures would mirror and/or complement, to the extent practicable, ASMFC measures included in the Coastal Shark FMP and Addendum I to the

Coastal Shark FMP. Smooth dogfish were included in the ASMFC Interstate FMP for Coastal Shark when that FMP was approved in late 2008. In early 2009, ASMFC began the process of revising that FMP to include an exemption for allowing smooth dogfish fishermen to remove smooth dogfish fins from the carcass. On May 6, 2009, the ASMFC approved a smooth dogfish Addendum to the Atlantic Coastal Sharks FMP for public comment. On August 19, 2009, ASMFC approved the Addendum. Included within this Addendum is an exception for smooth dogfish to allow at-sea processing (*i.e.*, removal of shark fins while still onboard a fishing vessel), removal of recreational retention limits for smooth dogfish, and removal of the two hour net-check requirement for shark gillnets (ASMFC, 2009). Specifically, for smooth dogfish the Addendum requires that:

1. “Commercial fishermen may completely remove the fins of smooth dogfish from March through June of each year. If fins are removed, the total wet weight of the shark fins may not exceed 5 percent of the total dressed weight of smooth dogfish carcasses landed or found on board a vessel;” and,
2. “From July through February for the smooth dogfish fishery only, commercial fishermen may completely remove the head, tail, pectoral fins, pelvic (ventral) fins, anal fin, and second dorsal fin, but must keep the dorsal fin attached naturally to the carcass through landing. Fins may be cut as long as they remain attached to the carcass (by natural means) with at least a small portion of uncut skin. If fins are removed, the total wet weight of the shark fins may not exceed 5 percent of the total dressed weight of smooth dogfish carcasses landed or found on board a vessel.”

The ASMFC Smooth Dogfish Addendum does not require a smooth dogfish-specific permit, rather they are required to hold the applicable state permits. In most cases, state permits are not species-specific. The Addendum also eliminates a smooth dogfish bag limit in the recreational fishery.

F3 is not anticipated to have any short-term, direct ecological impacts (adverse or beneficial) to the stock as current fishing levels are not anticipated to impact the stock within the next year or two. However, while the ASMFC has not established a quota for the smooth dogfish fishery, NMFS is required to establish ACLs and AMs under the Magnuson-Stevens Act. NMFS believes that establishing and monitoring a quota and requiring permitting is the first step to gaining information about the fishery. Without a quota, alternative F3 would not prevent landings from increasing and would not result in data collection on the numbers of participants in the fishery and catch and effort information. These data could be used to characterize the fishery and determine stock status for smooth dogfish. Given this, in the long-term, if current fishing effort is putting too much pressure on the stock, long-term, direct, moderate adverse ecological impacts could occur as landings would continue to go undocumented or potentially increase under alternative F3.

Indirectly, no ecological impacts are anticipated in the short-term as impacts to habitat or other species are not anticipated to be affected in the next year or two by current landings of smooth dogfish. However, in the long-term, moderate adverse ecological impacts could occur if habitat is being disturbed by fishing gears but no mitigating measures are taking place. In addition, species identification could be compromised if smooth dogfish are processed at sea

with fins removed. The at-sea processing would require a 5-percent fin to carcass ratio, which is consistent with federal statute, but would allow for the removal of fins at sea, which is contrary to other shark fisheries. Allowing the complete removal of all fins for part of the year could allow for full processing of the shark. As described above, this type of processing could have negative ecological impacts on other shark species as it is difficult, if not impossible without DNA testing, to correctly identify the fillet of one type of shark from the fillet of another type of shark. Thus, processing of smooth dogfish while at sea could compromise species identification, which could impact the quality of future stock assessment, as well as result in other shark species potentially being finned. NMFS recently implemented the fins attached regulation for all Atlantic sharks for enforcement and species identification reasons, and NMFS would not want to open a loophole that would hinder enforcement. Additionally, both the House of Representatives and the Senate are reviewing bills that, if approved and signed by the President, would require all fins be naturally attached for all sharks in U.S. federal waters. The United States, in several international meetings, has advocated for a fins-attached policy in all shark fisheries world-wide. Allowing an exemption for smooth dogfish in federal water would be contrary to this policy.

Thus, for the reasons outlined above, NMFS does not prefer to mirror the ASMFC regulations regarding smooth dogfish at this time. Nonetheless, because consistent regulations are generally preferred for a number of reasons including, but not limited to, enforcement of the regulations and ease of understanding, NMFS would continue to work with ASMFC to ensure federal and state regulations are consistent, to the extent practicable.

#### *Social and Economic Impacts*

In the short-term, the No Action alternative F1 would likely not have any new direct social or economic impacts beyond the status quo, as no action would be taken. However, under the No Action alternative, NMFS would not implement a quota or collect any additional fishery participant information. Thus, if fishing effort is too high for the stock, catches could decrease in the long-term, resulting in lost revenues and direct, minor adverse socioeconomic impacts on fishermen. Similarly, in the short-term, there are no indirect socioeconomic impacts expected for dealers and fish processors compared to the status quo as the fishery would continue to operate as it has been. However, in the long-term, if fishing effort on the stock is not sustainable, then decreased catches and reduced shark product could translate into decreased revenues for shark dealers, processors, and other entities that deal with shark product. These decreased revenues would result in indirect, minor adverse socioeconomic impacts on dealers and other businesses that rely on shark product. Therefore, NMFS does not prefer this alternative at this time.

Alternative F2 would require federal commercial and recreational fishing permits as well as require fishermen to land smooth dogfish with all of their fins naturally attached. These changes could result in short-term, direct significant adverse socioeconomic impacts on fishermen who are used to processing smooth dogfish at sea as explained below. However, NMFS would delay the implementation of these requirements until the start of the 2012 fishing season to allow time for fishermen to adjust to the changes and to allow time for the development of a new commercial smooth dogfish permit. Thus, in the short-term, alternative F2 would result in significant but mitigated to be less than significant socioeconomic impacts due to the delay in implementation of these requirements. Once fishermen adjust to the new

measures, NMFS anticipates that there would be no direct socioeconomic impacts to fishermen in the long-term.

NMFS does not intend for alternative F2 to result in large changes of catch levels or rates once fishermen adjust to the new regulations. Rather, the purpose of this alternative is to focus on collecting information that would allow the fishery to be characterized. As mentioned above, alternative F2 would require recreational and commercial fishermen who land smooth dogfish in federal waters to obtain a federal smooth dogfish permit. Shark dealers who purchase smooth dogfish would also have to obtain a federal shark permit; however, this is currently a requirement under the ASMFC's Coastal Shark FMP. At this time, the commercial smooth dogfish fishing permit would be an open access permit. NMFS is currently working with the Southeast Regional and the Northeast Regional Offices to determine which facility is more appropriate for issuing and administering a new commercial smooth dogfish fishing permit. The cost associated with the permit would most likely be similar to the cost of other open access HMS permits, which is \$20.00 for the HMS angling permit in 2010. However, NMFS would delay the need for such a permit until the 2012 fishing season to allow time for the Agency to implement such a permit and to allow fishermen to plan accordingly. A federal permit requirement for retaining smooth dogfish in federal waters may result in fishermen fishing in state waters only. This may result in a slight change in fishing practices as approximately 50 percent of the fishery is currently prosecuted in state waters. This change could result in direct, minor adverse impacts in the short-term as fishermen adjust to fishing in new areas and experience reduced catch rates as they explore new fishing grounds. As fishermen become accustomed to new fishing grounds, NMFS anticipates that there would be no long-term direct socioeconomic impacts to fishermen. In addition, fishermen would be fishing closer to shore, which could reduce fuel costs, length of trips, and increase safety, potentially resulting in direct, minor beneficial socioeconomic impacts. Finally, fishermen with a federal smooth dogfish commercial fishing permit would be eligible to carry a NMFS-approved scientific observer. Carrying an observer may cause some indirect, minor adverse socioeconomic impacts in the short- and long-term as fishermen coordinate carrying an observer and covering the cost of their care (*i.e.*, food and bunk space). An estimated 223 vessels would be required to obtain a commercial smooth dogfish permit as a result of this alternative. Because this number is based on the number of vessels that report smooth dogfish landings now, despite the lack of federal management, this number could be an underestimate of how many will actually obtain a federal smooth dogfish permit.

Based on the life history of this species, and the fact that most recreational fishermen are shore-based, NMFS believes that the recreational smooth dogfish fishery is likely concentrated in state waters, and most anglers would not require a federal HMS Angling permit. Those that fish in federal waters would need to pay the nominal fee of approximately \$20.00 for a recreational HMS Angling category or CHB permit. Obtaining this permit, which would also allow anglers to fish recreationally for other HMS, is not expected to create an impediment to entering or remaining in the recreational fishery, and therefore, should not result in any direct or indirect short- or long-term impacts to recreational fishermen.

Shark dealers who buy smooth dogfish from federally permitted vessels would be required to purchase a shark dealer permit and attend shark identification workshops. In addition, they would be required to report smooth dogfish on HMS dealer reports or through

SAFIS. However, many dealers already report smooth dogfish landings, and a federal shark dealer permit is already required in states along the eastern seaboard, which is where the primary smooth dogfish fishery is located, under the ASMFC's Coastal Shark FMP. Therefore, shark dealer permits should not result in any direct short- or long-term impacts. However, if fishermen leave the smooth dogfish fishery in response to the new management measures under F2, then dealers and other entities that deal with shark product may experience indirect, minor adverse socioeconomic impacts in the short-term due to reduced smooth dogfish product and lost revenues. However, these impacts may be resolved in the long-term as dealers and processors switch to other products to compensate for lost smooth dogfish revenues or buy more smooth dogfish product from fishermen fishing only in state waters.

NMFS received numerous comments stating that the fins-attached requirement in the smooth dogfish fishery would significantly alter the fishery, and potentially result in the cessation of the fishery in federal waters. As stated above, NMFS' intention under this alternative is to minimize changes in the catch levels and catch rates, to the extent practicable, in order to collect information about the fishery. However, the practices currently employed in the smooth dogfish fishery are sometimes in conflict with other shark management measures currently in place in the Atlantic, such as the requirement to land all sharks with fins naturally attached through offloading. These practices include removing fins from the smooth dogfish, and in some cases, removing the skin and fully processing the shark while on board the vessel. NMFS recognizes fishermen's concerns that requiring fins remain naturally attached is a significant change for the fishery and could result in significant changes in how the fishery operates, including the potential cessation of fishing for smooth dogfish in federal waters. However, requiring smooth dogfish fins to remain naturally attached to the carcass is necessary for several reasons: to maintain consistency with other domestic shark regulations that require the fins remain attached while keeping the carcass essentially whole; to maintain consistency with the United States' international shark conservation and management positions; and to facilitate enforcement and species identification, as the dressed carcass and detached fins of a smooth dogfish could be misidentified as a dressed carcass or detached fins of a SCS, juvenile LCS, or spiny dogfish. Identifying all sharks to the correct species is a vital step in logbook and dealer reporting and enforcement of the regulations. These reports are used to monitor catch levels in relation to quotas and to advise stock assessments.

Currently, participants in the smooth dogfish fishery fully process the fish into "logs" or fillets of meat. Identifying the species of fully processed carcasses from cuts of meat is very difficult and may require DNA analysis. For this reason, for a number of years before requiring fins be attached, NMFS prohibited the filleting of sharks at sea and required all sharks be landed as logs. Over many years, NMFS has worked to clarify this regulation and ensure shark fishermen were aware of it. In the 2006 Consolidated HMS FMP, NMFS took a further step of requiring the second dorsal and anal fin be maintained on the dressed carcass. Furthermore, the ability to identify both carcasses and fins to the species level is essential to enforcing the prohibition on shark finning. The most effective way for fishermen, dealers, and enforcement to properly identify both fins and carcasses is to require fins remain naturally attached through offloading. Detached smooth dogfish fins can be difficult for most people to differentiate from some other shark fins. Differentiating numerous detached smooth dogfish fins from other shark fins can be inefficient and often difficult from a practical enforcement perspective, particularly in

a high volume fishery such as the smooth dogfish fishery. Since July 2008, all sharks currently managed in the Consolidated HMS FMP that can be landed (*e.g.*, large coastal sharks, small coastal sharks, and pelagic sharks) must be landed with fins naturally attached. Deviating from this measure in the smooth dogfish fishery would introduce management inconsistencies and potential enforcement loopholes. To the extent that requiring fins remain attached aids enforcement in correctly identifying sharks more quickly, there could be some minor benefits to fishermen whose vessels were boarded as they would be able to return to fishing or offloading their fish in a more timely manner.

The fins naturally-attached regulation is also consistent with the U.S. international position on shark conservation and management. Globally, shark finning is a serious threat to many shark species. The United States has co-sponsored fins attached proposals in international fora and supported an international ban on the practice of shark finning and has recently proposed adding several species to the CITES Appendix II listing to aid in monitoring the shark fin trade. An effective method to enforce this ban, particularly in areas lacking enforcement resources, is to require fins remain naturally attached to the shark carcass through offloading. In addition to this requirement, the United States also encourages maintaining the five percent fins to carcass ratio. The five percent fin to carcass ration is a critical tool for dockside enforcement when enforcement officers are unable to monitor an entire offload, and enhances shark conservation efforts by allowing NOAA to utilize dealer landing records to detect potential shark finning violations post-landing for subsequent follow-up investigation. If domestic exemptions to the fins naturally attached regulation were implemented, it could undermine the United States' international position on the fins naturally attached policy and other shark conservation and management measures.

NMFS' requirement to land smooth dogfish with fins naturally attached would not prohibit at-sea processing methods currently in place in the other Atlantic shark fisheries that maximize meat quality, freshness, and processing efficiencies. In the commercial shark fishery, it would remain legal to remove the smooth dogfish's head and viscera for proper bleeding; recreational fishermen would be required to keep the head and fins naturally attached but could still remove the viscera and bleed the shark. However, not being able to remove the fins from the sharks while at sea could result in increased handling and processing time, particularly for commercial fishermen, which could result in changes in fishing practices and time spent at the dock. If this creates conflicts with other user groups, then smooth dogfish fishermen could experience direct significant adverse socioeconomic impacts in the short-term. To reduce dockside processing needs, all fins of the smooth dogfish could be partially cut at the base and only left attached via a small flap of skin. Under alternative F2, NMFS intends to delay the effective date of the implementation of this requirement until 2012 to allow fishermen and dealers time to adjust to the new requirement and NMFS believes that the methods and techniques employed in other shark fisheries, such as partially cutting the fins before freezing, can be adopted in the interim. Thus, in the short-term, alternative F2 would result in significant but mitigated to be less than significant socioeconomic impacts due to the delay in implementation of these requirements.

The EFH identified and described for smooth dogfish would not have any social or economic impacts. The designation satisfies a statutory requirement, and no management measures are associated with its designation.

Social impacts resulting from alternative F2 and the associated sub-alternatives primarily relate to perceptions regarding the current state of the fishery. Anecdotal evidence suggests that smooth dogfish are often considered an incidental catch in commercial fisheries and are only rarely targeted. A large portion of the catch enters the commercial market, but some are retained only for bait in other fisheries. Due to the lack of reporting requirements, NMFS is unsure of the extent of these different uses. Furthermore, smooth dogfish are considered by some to be a nuisance species, sometimes interrupting more desirable commercial and recreational fisheries. Negative perceptions such as these, to the extent they exist, could confound management actions if participants in the fishery do not see the need to manage a bycatch, bait, or nuisance species. Establishing federal management could alter these attitudes and change the low perception of the species. Some public comments expressed surprise about the existence of a directed smooth dogfish fishery, and federal management of the species could inform the public on the importance of the resource. This change in perception would likely have no direct or indirect social impacts in the short- or long-term except in the case of participants using smooth dogfish as bait. In this case, participants may feel the requirements associated with federal level management are unnecessary and hinder the use of the species as an inexpensive source of bait. This could lead to indirect, minor adverse socioeconomic impacts as fishermen would have to find another suitable bait source and potentially purchase a federal smooth dogfish permit.

Alternatives F2a1, which would establish a smooth dogfish quota that is equal to the average annual landings from 1998-2007, and F2a2, which would establish a smooth dogfish quota equal to the maximum annual landing between 1998-2007, could potentially have short-term, direct, minor adverse economic impacts to fishermen if the associated quotas reflect a significantly underreported fishery. If the actual landings are higher than these two quotas, fishermen would be prevented from fishing at status quo levels, resulting in lost revenues. As the quota is slightly lower under F2a1, this could result in a long-term, direct moderate adverse socioeconomic impact compared to F2a2, which is a slightly higher quota and slightly higher revenues associated it (see Chapter 6). F2a2 could result in long-term, direct, minor socioeconomic impacts. Indirectly, shark dealers and processors may experience minor adverse socioeconomic impacts in the short- and long-term if the fishery is underreported and the quotas proposed under F2a1 and F2a2 do not accurately characterize current catch level of smooth dogfish. As such, these quotas would result in a short- and long-term loss in smooth dogfish revenues. Therefore, NMFS does not prefer these two alternatives at this time.

Alternative F2a3, which would establish a smooth dogfish quota above the maximum annual landings between 1998 and 2007, is not anticipated to have any short-term, direct socioeconomic impacts as the quota of maximum historical annual landings plus one standard deviation between the years 1998 and 2007 could allow a buffer for potential unreported landings during that time. However, if the quota under this alternative did not accurately capture historical landings, then fishermen could be losing smooth dogfish revenues over the long-term, which could result in direct, minor adverse socioeconomic impacts. Indirectly, shark dealers and processors may experience minor adverse socioeconomic impacts in the short- and long-term if

the smooth dogfish landings are underreported and the quota proposed under F2a3 does not accurately characterize current catch level of smooth dogfish. Based on public comment, as detailed above, NMFS does not believe that this alternative would adequately account for underreporting.

Alternative F2a4, the preferred alternative, would establish a smooth dogfish quota above the maximum annual landings between 1998 and 2007. NMFS does not anticipate any short- or long-term, direct socioeconomic impacts with implementing a quota based on maximum historical annual landings plus two standard deviations between the years 1998 and 2007 to allow for a buffer for potential unreported landings during that time. This would allow the fishery to continue at the current rate and level into the future without having to be shut down prematurely. Given the fishery would expect to operate as it currently does, NMFS does not anticipate any indirect impacts in the short- or long-term for shark dealers and processors. Thus, alternative F2a4 is NMFS' preferred alternative at this time.

NMFS does not anticipate any direct or indirect socioeconomic impacts in the short- or long-term with alternative F2b1. There is no charge associated with fishermen and researchers obtaining an exempted fishing permit (EFP), scientific permit (SRP), display permit, or letter of acknowledgement (LOA) for research or the collection for public display. In addition, NMFS would establish a smooth dogfish set-aside that would accommodate current and future research activities. Thus, NMFS does not anticipate any adverse socioeconomic impacts associated with alternative F2b1. In addition, given this alternative is also not anticipated to have any ecological impacts on smooth dogfish or other species of sharks in the shark research and display quota, NMFS prefers this alternative at this time.

As with alternative F2b1, NMFS does not anticipate any direct or indirect socioeconomic impacts in the short- or long-term with alternative F2b2. There is no charge associated with fishermen and researchers obtaining an EFP, SRP, display permit, or LOA for research or for the collection for research or for public display. In addition, NMFS would establish a smooth dogfish set-aside that would accommodate current and future research activities. Thus, NMFS does not anticipate any socioeconomic impacts associated with alternative F2b2. However, since this alternative could have direct and indirect, minor adverse ecological impacts to some species in sharks in the long-term as discussed above, NMFS does not prefer this alternative at this time.

Alternative F3 would likely have direct, minor adverse economic impacts in the short term. While most of the ASMFC regulations would not change the smooth dogfish fishery as it currently operates, fishermen would be required to leave the dorsal fin on the smooth dogfish through landing from July through February, which could change how the fishery operates, and therefore, have direct minor, adverse socioeconomic impacts in the short-term. The extent of these impacts will depend on how many smooth dogfish are landed between July and February of each year. Because this requirement began in state waters in January 2010, it could mitigate some of the socioeconomic impacts associated with alternative F2 with regard to the requirement of having all fins naturally attached under the federal plan. Thus, by the start of the fishing season in 2012, fishermen who have been fishing in state waters should have a better idea of how to keep all fins naturally attached.

In the long-term, since no quota is being established under alternative F3, if fishing effort is too high for the stock, catches could decrease in the long-term, resulting in lost revenues and direct, minor adverse socioeconomic impacts on fishermen. Indirectly, in the short-term there are no indirect socioeconomic impacts expected for dealers and fish processors compared to the status quo as the fishery would continue to operate as it has been with the exception of the requirement to leave the dorsal fin on from July through February. However, if the requirement to have the dorsal fin attached during certain times of the year affects how dealers and processors process smooth dogfish, then there could be indirect, minor adverse socioeconomic impacts on smooth dogfish dealers until they learn how to process these sharks during July through February. In the long-term, if fishing effort on the stock is not sustainable, then decreased catches and reduced smooth dogfish product could translate into decreased revenues for shark dealers, processors, and other entities that deal with smooth dogfish product. This would result in indirect, minor adverse socioeconomic impacts on dealers and other businesses that rely on smooth dogfish. Additional social impacts resulting from alternative F3 are likely the same as those described for alternative F2.

### *Conclusion*

Under the Magnuson-Stevens Act, NMFS must, consistent with National Standard 1, manage fisheries to achieve optimum yield on a continuing basis while preventing overfishing. Thus, NMFS prefers alternative F2 to include smooth dogfish in a federal management plan and implement a federal permit requirement to better characterize the universe of fishermen landing smooth dogfish and to collect landings data from dealer reports. In addition, the Magnuson-Stevens Act requires the establishment of ACLs and AMs for each species within a fishery unless the species is subject to narrow exemptions. Smooth dogfish are not exempt from the requirement. NMFS prefers to establish a quota equal to the maximum annual landings plus two standard deviations between the years 1998 and 2007 to serve as the landings component of the sector ACL: a specific level of catch that could prevent overfishing of the species. This quota would allow the fishery to operate as it has without unintentional restrictions. The quota would be set above the maximum recorded landings given fishermen have not had to report smooth dogfish landings in the past. The two standard deviations buffer would ensure that the fishery is not unnecessarily restricted while also ensuring that effort does not increase significantly until a stock assessment is conducted. In the short-term, this alternative is not anticipated to have any direct ecological impacts as the population is not expected to change in the next year or two in response to keeping landings the same as they have been during the last 10 years. However, in the long-term, this alternative could have direct, minor beneficial ecological impacts on the stock by capping effort and thus not allowing landings to increase. NMFS does not anticipate any short-or long-term, direct or indirect socioeconomic impacts with implementing the preferred quota alternative. NMFS would also establish a 6 mt ww set aside quota for smooth dogfish taken under scientific research. The set-aside would not be expected to have any direct or indirect short- or long-term ecological impacts given the extremely small size of the set aside quota. For AMs, smooth dogfish would be subject to the same closure requirements as other shark species when 80% of quota is reached and would include additional provisions for addressing overharvest in subsequent seasons.

The management measures proposed under F2, including a permit requirement, the requirement that federal dealers report smooth dogfish landings, and the requirement to land

smooth dogfish with their fins naturally attached, could result in short-term, direct, minor, beneficial ecological impacts on smooth dogfish if the requirement of a federal permit and/or the requirement to keep fins attached reduces the number of participants in the fishery and the amount of smooth dogfish landed. In the long-term, the ecological impacts could also be direct, minor, and beneficial if fishing effort does not increase and landings data are collected to better characterize the fishery and the stock. In the short-term, direct significant adverse socioeconomic impacts would be anticipated on fishermen who are used to processing smooth dogfish at sea due to the fins attached requirement. The smooth dogfish fishermen would potentially need to learn a new way of processing smooth dogfish and spend additional time on the dock processing smooth dogfish after landing. However, NMFS would delay the implementation of these requirements until the start of the 2012 fishing season to allow time for fishermen to adjust to the regulatory changes. Thus, in the short-term, alternative F2 would result in significant but mitigated to be less than significant adverse socioeconomic impacts due to the delay in implementation of these requirements. Once fishermen adjust to the new measures, NMFS anticipates that there would be minor adverse socioeconomic impacts to fishermen in the long-term. NMFS prefers alternative F2 because this alternative, unlike alternative F1, would help collect information on the fishery that should aid in any future stock assessments. Additionally, this alternative, unlike alternative F3, is consistent with NMFS' goals of maintaining consistency with other domestic shark regulations that require the fins remain attached while keeping the carcass essentially whole; maintaining consistency with the United States' international position; and facilitating enforcement and species identification, as the dressed carcass of a smooth dogfish could be misidentified as a dressed carcass of a SCS, juvenile LCS, or spiny dogfish. While NMFS' intent under these alternatives is to minimize changes in catch levels and rates, NMFS recognizes that requiring fins attached is a large change in how the fishery operates. To give fishermen time to adjust to this new requirement, NMFS prefers to delay the implementation of alternative F2 until the start of the smooth dogfish fishing season in 2012.

NMFS is currently engaged in formal consultation under the ESA with SERO PRD to determine the potential level of incremental effect that may arise as a result of the preferred management measures for smooth dogfish in the FEIS. SERO PRD has not yet issued a final BiOp for the smooth dogfish fishery. NMFS will review that BiOp once it is issued and supplement the analysis in this FEIS if the consultation reveals any new or significant effects with respect to the interaction between gillnet fishing for smooth dogfish and protected species that were not considered in the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP. This FEIS incorporates by reference the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP. A detailed discussion of the effects of such management relevant to the shark fishery is included in that document. NMFS does not anticipate any substantial change in impact to protected species since the measures proposed for smooth dogfish management are largely administrative, and thus unlikely to affect the manner and extent of fishing for smooth dogfish or redistribution of effort into other fisheries. NMFS assumes there is a correlation between fishing effort and protected species interactions. Since smooth dogfish management measures would establish a quota and permit requirement, fishing effort for smooth dogfish would be capped or slightly reduced with a corresponding diminishment of the possibility of increased protected resource interactions. In addition, increased observer in the smooth dogfish

fishery as a result of a federal permit requirement would better characterize protected resources interactions with the smooth dogfish fishery.

Under the preferred alternative (F2), the implementation of the management measures would be delayed until the beginning of the smooth dogfish fishing season in 2012 to allow time to consider and evaluate the information and requirements included in the final BiOp. If the assessment of effects in the BiOp provides new and meaningful information not considered in this FEIS, NMFS will supplement the FEIS, as appropriate, before implementing any management measures proposed in F2. In the interim, NMFS will not impose any management authority or related conservation and management measures on the smooth dogfish fishery, and thus will not cause any effect on protected species related to such management. In other words, preferred alternative F2 would maintain the status quo with respect to the smooth dogfish fishery as it relates to protected species prior to receiving a final BiOp. While NMFS would finalize the rulemaking with measures for blacknose shark and shortfin mako sharks becoming effective 30 days after publication of the final rule in the Federal Register, the measures, if any, selected for management of smooth dogfish would be deferred to allow NMFS, in consultation with SERO PRD, to develop reasonable and prudent alternatives (RPAs) that could be implemented while avoiding adverse impacts to listed species, as necessary.

#### **4.4 Impacts on Essential Fish Habitat**

The Magnuson-Stevens Act requires NMFS, 16 U.S.C. 1855((b)(1), as implemented by 50 C.F.R. §800.815, to identify and describe essential fish habitat (EFH) for each life stage of managed species and to evaluate the potential adverse effects of fishing activities on EFH §800.815(a)(2) including the cumulative effects of multiple fisheries activities. If NMFS determines that fishing gears are having an adverse effect on HMS EFH, or other species' EFH, then NMFS must include management measures that minimize adverse effects to the extent practicable. Ecological impacts to EFH due to actions in this final amendment would likely be long-term moderate, indirect beneficial impacts, as the preferred alternatives would decrease SCS fishing effort with BLL and gillnet gear as a result of reduced non-blacknose SCS and blacknose shark quotas. EFH designation for smooth dogfish is detailed in Chapter 11 of this document. In the 2006 Consolidated HMS FMP and Amendment 1 to the 2006 Consolidated HMS FMP, NMFS reviewed the various gear types with the potential to affect EFH and, based on the best information available at this time, NMFS has determined that fishing is not likely to adversely affect EFH for smooth dogfish. Thus, there is no evidence to suggest that implementing any of the preferred alternatives in this amendment would adversely affect EFH to the extent that adverse effects could be identified on the habitat or fisheries.

#### **4.5 Impacts on Protected Resources**

This section contains a discussion of the expected protected resources impacts from each of the analyzed alternatives.

##### *Alternative A1*

Alternative A1, the No Action alternative, would retain the status quo in the shark fishery in terms of quotas for non-blacknose SCS, and blacknose sharks. Therefore, the direct impacts on protected resources would be neutral in the short- and long-term, as there would be no increase,

or decrease, in fishing effort. With all current gears used in the shark fisheries to remain authorized, the indirect impacts on protected resources, and the environment, would be neutral in the short-term and the long-term, since there would be no change in how the fisheries are prosecuted.

#### *Alternative A2*

Alternative A2 would establish a non-blacknose SCS quota of 221.6 mt dw, which is the average landings for several SCS species for 2004 – 2008. The blacknose specific quota recommended in this action would be 12.1 mt dw, which represents a 78 percent reduction in landings for this species. The direct impacts from alternative A2 on protected resources in the short-term would be neutral because there would be a minimal change in the fishing effort in the shark fisheries, since the non-blacknose SCS quota in this alternative would be the same average amount of non-blacknose SCS harvested over the last few years. In the long-term, a reduced quota for blacknose sharks would lead to a reduction in fishing effort (albeit minimal), therefore there would be a long-term, direct benefit for protected resources from alternative A2 compared to the No Action alternative, but the impacts would be minor.

#### *Alternative A3*

Alternative A3 would set a non-blacknose SCS quota of 110.8 mt dw, a reduction of 50 percent from the average landings for the years 2004 – 2008. A blacknose specific quota would be set at 19.9 mt dw, a 64 percent reduction. Alternative A3 would result in reduced fishing effort in the shark fisheries due to the lower quotas for non-blacknose SCS and the blacknose-specific quotas. This reduction in effort would have direct, minor, beneficial impacts on protected resources in the short-term as reduced effort over one to two years is anticipated to have minimal impacts on protected resources. Over time the reduced effort in the fishery would result in moderate benefits for protected resources, since interactions would be further decreased.

#### *Alternative A4*

Alternative A4 would establish a non-blacknose SCS quota of 55.4 mt dw, which is a 75 percent reduction in the average landings from 2004 – 2008. A blacknose specific quota under this action would be set at 15.9 mt dw, a 71 percent reduction. Although the interactions between gillnets and protected resources are minimal, the combined reduction in fishing effort, and removal of gillnets as an authorized gear in the SCS shark, is likely to have both a direct, and indirect, beneficial impact on protected resources. These impacts would be minor in the short-term, but would likely become moderate in the long-term when compared to the No Action alternative. This moderate long-term beneficial impact would be due to the significant reduction in fishing effort from the quota and gear restrictions in alternative A4 when combined with B2 or B3.

#### *Alternative A5*

Alternative A5 would close the SCS fishery. On average from 2004 – 2008, there were 251 trip/year for all gears in the SCS fishery. Although most of the fishermen that currently fish in the SCS fishery would switch to other fisheries; some would switch gears to target other species, while others would leave the practice of fishing altogether. There would likely be a reduction in fishing effort, which would have a direct beneficial impact on the already low interaction rates between protected resources and the shark fishery. There could also be an indirect beneficial impact on the habitats for some protected resources by reducing potential

interactions of shark fishing gear and habitat; however, this would be minor as gear used in the shark fishery has been determined to not have negative impacts on habitat. These impacts would be expected to minor in the short-term, but would improve to moderate in the long-term.

#### *Alternative A6, Preferred Alternative*

Alternative A6 would set the annual non-blacknose SCS quota (221.6 mt dw) at a level that would be equal to the average landings seen in the fishery from 2004 – 2008. A blacknose specific quota of 19.9 mt dw (64 percent reduction) would be established. With minimal reduction in fishing effort (mostly through the blacknose shark quota), alternative A6 would likely have direct and indirect benefits for protected resources, but due to the small reduction in effort, the impact would only be minor. As previously mentioned, since the impact on protected resources is minimal in the gillnet fishery, the cumulative impact would be slightly more beneficial than the No Action alternative.

#### *Alternative B1, Preferred Alternative*

Historical data indicates that the impact of gillnets on non-shark protected species (marine mammals, turtles, *etc.*) has been minimal, with infrequent interactions over the last few years, and none in 2008 (Passerotti and Carlson, 2009). Between 2000 and 2007, a total of 16 marine turtles have been observed caught in the shark gillnet fisheries, of those 16 turtles, 10 were released alive, 2 were released dead, and 4 were of unknown condition (Passerotti and Carlson, 2008). Observed takes of marine mammals in the Southeast Atlantic shark gillnet fishery during 1999 – 2007 totaled 12 bottlenose dolphins and 4 spotted dolphins (Garrison, 2007). By retaining gillnets as an authorized gear in the SCS, the direct and indirect impacts of alternative B1 on protected species would be neutral over the short- and long-term, since the action would retain the status quo. It is expected that the rate of interactions with protected resources would continue at nearly the same low level as seen in recent years.

#### *Alternative B2*

Alternative B2 would remove gillnet gear as an authorized gear in the SCS fishery. During the period from 2004 – 2008, there were on average 122 trips/year that used gillnets as the primary gear to fish in the SCS fishery. Prohibiting the use of gillnets in federal waters would most likely lead to an increase in effort by gillnet fishermen in some state waters. As describe above, the interaction of protected resources with gillnets historically has been infrequent, and most recently those interactions were effectively eliminated. There would be beneficial impact on protected resources in both the short- and long-term under alternative B2, as already low interactions would be further reduced, but the impacts would be minor.

#### *Alternative B3*

Alternative B3 would prohibit the use of gillnet gear from South Carolina south, including the Caribbean Sea and the Gulf of Mexico. This alternative takes into consideration the smooth dogfish fishery, which uses gillnets, and is predominately a fishery that occurs from North Carolina north. There would be beneficial impacts in the short-term and the long-term, as already low interactions would be further reduced, but the impacts would be minor due to the relatively small number of trips that used gillnets in these waters.

### *Alternatives C1-C6*

The alternatives affecting the commercial (alternatives C1-C6) shortfin mako shark fishery would, for most alternatives, have a neutral impact on protected resources. Cumulative impacts, and short- and long-term, indirect impacts, are anticipated to be neutral, because the alternatives would not change the operation of these fisheries. Therefore, current fishing practices would continue to take place in a very similar fashion and it is anticipated that their indirect impact on protected species habitat and their cumulative impact with other fisheries on protected species would remain the same. Short-term, direct, impacts are expected to be neutral, mainly because these alternatives would not significantly alter current operations of commercial or recreational fisheries. This is also true in the long-term for all alternatives except for alternative C5, which proposes to work internationally to end overfishing of shortfin mako sharks. For alternative C5 in the long-term, if management recommendations adopted at the international level to end overfishing of shortfin mako sharks cause a significant change in overall effort in U.S. commercial and recreational fisheries that catch shortfin mako shark, these measures could provide a minor, beneficial, long-term impact to protected resources.

### *Alternative D1-D4 (Alternative D1, Preferred Alternative)*

Alternatives D1 through D4 would have short-term, long-term, and cumulative, neutral protected resource impacts. Since Alternative D1 would keep the current recreational size and retention limits for blacknose sharks, which would not change the previous impacts from the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP, the impacts to protected resources would be neutral. Alternative D2 would decrease the minimum recreational size of blacknose sharks to 36 inches FL. Therefore, decreasing the minimum size for blacknose sharks could result in minimal increase in landings of blacknose sharks, the protected resource impacts would be neutral. Increasing the retention limit for sharpnose sharks in alternative D3 would cause neutral protected resource impacts because fishermen are already discarding sharpnose sharks and this alternative would not add more fishing effort on protected resources. Since Alternative D4 would be the same effort as alternative D1 because blacknose sharks rarely reach the current 54 inch FL minimum size limit, the impacts to protected resources would be neutral.

### *Alternatives E1-E5*

Alternatives affecting the recreational (alternatives E1-E5) shortfin mako shark fishery would, for most alternatives, have a neutral impact on protected resources. The authorized gear types used in the recreational shortfin mako shark fishery (*e.g.*, hook and line) have minimal interactions with protected species and inconsequential impacts on fishery habitats. Short- and long-term, indirect impacts, are anticipated to be neutral, because the alternatives would not change the operation of these fisheries. Therefore, current fishing practices would continue to take place in a very similar fashion and it is anticipated that their indirect impact on protected species habitat and their cumulative impact with other fisheries on protected species would remain the same. Short-term, direct, impacts are expected to be neutral, mainly because these alternatives would not significantly alter current operations of recreational fisheries. This is also true in the long-term for all alternatives except for alternative E3, which proposes to work internationally to end overfishing of shortfin mako sharks. For alternative E3 in the long-term, if management recommendations adopted at the international level to end overfishing of shortfin mako sharks cause a significant change in overall effort in U.S. commercial and recreational fisheries that catch shortfin mako shark, these measures could provide a minor, beneficial, long-term impact to protected resources.

### *Alternative F1*

The No Action alternative is not anticipated to have any short-term, direct impacts on protected resources over the next year or two. However, in the long-term, if there are undocumented takes of protected resources occurring, these cumulative takes could result in direct, moderate adverse impacts. This would be a potentially greater concern if the fishery grew and effort increased, which currently would be allowed under the No Action alternative. However, there are no indirect ecological impacts anticipated in the short- or long-term protected resources as fishing for smooth dogfish is not expected to impact habitat or ecosystem components (*i.e.*, predator/prey relationships) for protected resources, even if the fishery were to increase in the future.

### *Alternative F2, Preferred Alternative*

The NMFS Southeast Regional Office Protected Resources Division (SERO PRD) has initially determined that management of smooth dogfish may adversely affect ESA-listed species. Based on this determination, NMFS initiated formal Section 7 consultation in accordance with the ESA, paragraph 7(a)(2), and provided SERO PRD with the information required by 50 CFR 402.14(c). SERO PRD is in the process of preparing a BiOp, which will not likely be issued prior to the Agency signing a Record of Decision for the final Amendment 3 to the 2006 Consolidated HMS FMP and implementing regulations. Use of gillnets in the shark fishery were considered in the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP, and while there are likely direct, minor adverse effects in the short-term, the gear type, location and effort are not likely to result in jeopardy of the listed species in the long-term. Under the No Action alternative for smooth dogfish (F1), these interactions and minor adverse effects would continue to occur because the fishery is currently operating in federal waters. Moreover, the ability for NMFS to minimize the take associated with gillnets for smooth dogfish would be limited in the absence of the preferred management measures, which would require data collection, permitting, and observer coverage. These effects are being explored in more detail with SERO PRD, who will issue a BiOp addressing the effects of the smooth dogfish fishery. NMFS does not anticipate that the smooth dogfish BiOp will reveal new or significant information regarding effects on listed species beyond those considered in the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP.

Under the No Action Alternative for smooth dogfish, based on the 2008 BiOp Amendment 2 to the 2006 Consolidated HMS FMP, the use of shark gillnets, including those used to fish for SCS, may result in interactions with species protected under the ESA, such as the northern right whale, smalltooth sawfish, and several species of sea turtles. Since the primary gear type associated with the smooth dogfish fishery is gillnets, it is anticipated that interactions with protected species, and the resultant potential adverse effects, will continue to occur. The effects of fishing with shark gillnets was fully evaluated in the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP, which recognized that gillnet shark fishing for SCS occurs primarily from FL north to Cape Hatteras, NC, although the gear type is banned by legislation in state waters of FL, SC and GA, which may force gillnet shark fishing into federal waters where the gear type is less effective. Moreover, the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP recognized that the shark gillnet fishery in both the Southeast and mid-Atlantic are subject to the restrictions imposed by the ALWTRP, and concluded that based on the ALWTRP, adverse effects to humpback and North Atlantic right whales were extremely

unlikely, and thus discountable. The ALWTRP will continue to apply to shark gillnet fisheries, including smooth dogfish, in state and federal waters, throughout the action area.

NMFS is currently engaged in formal consultation under the ESA with SERO PRD to determine the potential level of incremental effect that may arise as a result of the preferred management measures for smooth dogfish in the FEIS. SERO PRD has not yet issued a final BiOp for the smooth dogfish fishery. NMFS will review that BiOp once it is issued and supplement the analysis in this FEIS if the consultation reveals any new or significant effects with respect to the interaction between gillnet fishing for smooth dogfish and protected species that were not considered in the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP. This FEIS incorporates by reference the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP. A detailed discussion of the effects of such management relevant to the shark fishery is included in that document. NMFS does not anticipate any substantial change in impact to protected species since the measures proposed for smooth dogfish management are largely administrative, and thus unlikely to affect the manner and extent of fishing for smooth dogfish or redistribution of effort into other fisheries. NMFS assumes there is a correlation between fishing effort and protected species interactions. Since smooth dogfish management measures would establish a quota and permit requirement, fishing effort for smooth dogfish would be capped or slightly reduced with a corresponding diminishment of the possibility of increased protected resource interactions. In addition, in the short term, there are no indirect ecological impacts associated with F2 as these requirements are not anticipated to impact protected resources indirectly, such as disturbance of habitat. However, in the long term, these measures could result in indirect, minor beneficial impacts as observer coverage could help better characterize bycatch in the smooth dogfish fishery.

Under the preferred alternative (F2), the implementation of the management measures would be delayed until the beginning of the smooth dogfish fishing season in 2012 to allow time to consider and evaluate the information and requirements included in the final BiOp. If the assessment of effects in the BiOp provides new and meaningful information not considered in this FEIS, NMFS will supplement the FEIS, as appropriate, before implementing any management measures proposed in F2. In the interim, NMFS will not impose any management authority or related conservation and management measures on the smooth dogfish fishery, and thus will not cause any effect on protected species related to such management. In other words, preferred alternative F2 would maintain the status quo with respect to the smooth dogfish fishery as it relates to protected species prior to receiving a final BiOp. While NMFS would finalize the rulemaking with measures for blacknose shark and shortfin mako sharks becoming effective 30 days after publication of the final rule in the Federal Register, the measures, if any, selected for management of smooth dogfish would be deferred to allow NMFS, in consultation with SERO PRD, to develop reasonable and prudent alternatives (RPAs) that could be implemented while avoiding adverse impacts to listed species, as necessary.

While NMFS prefers alternative F2 at this time, it retains discretion to select any reasonable alternative considered in this FEIS, including the alternative to take no action. If, after consideration of the information gathered through outreach to stakeholders, the BiOp, and this FEIS, NMFS chooses to proceed with a different alternative than what was evaluated in this FEIS, re-initiation of formal consultation could be necessary if the alternative deviated from

information, analyses, conclusions and authorizations in the final BiOp for the preferred alternative. Moreover, NMFS would, if appropriate, amend the final rule and FMP amendment and supplement this FEIS before implementation of such management measures could occur.

#### *Alternatives F2a1-F2a4 (Preferred Alternative F2a4)*

Alternatives F2a1 through F2a4 would establish smooth dogfish quotas based on smooth dogfish landings over the past 10 years. For each one of these alternatives, there are no direct impacts to protected resources anticipated in the short-term by the establishment of a smooth dogfish quota. If fishing were to continue at levels similar to how the fishery has been prosecuted over the past 10 years, NMFS does not anticipate the fishery would jeopardize the existence of any protected resource in the next year or two. However, the establishment of a quota in the long-term could have direct, minor beneficial impacts to protected resources as it would cap fishing effort and potentially keep interactions from increasing over time. In addition, in the short- and long-term, there are no indirect ecological impacts associated with alternatives F2a1 through F2a4 as the establishment of quotas are not anticipated to impact protected resources indirectly, such as the disturbance of habitat.

#### *Alternatives F2b1 and F2b2 (Preferred Alternative F2b1)*

Alternatives F2b1 and F2b2 would establish a smooth dogfish research set aside. This set aside would be 6 mt ww, and would be a stand alone set aside under alternative F2b1 or would be combined with the current shark display and research set aside under alternative F2b2. In either case, there is no short- or long-term, direct or indirect impacts to protected resources with regard to the research set aside. The set aside is extremely small (4.3 mt dw) compared to the current commercial harvest of smooth dogfish (431.1 mt dw), and should result in few, if any interactions with protected resources. Such a set aside is also not anticipated to affect any habitat or ecosystem components (*i.e.*, predator/prey) for protected resources.

#### *Alternative F3*

Alternative F3 would implement federal management measures that would mirror and/or complement, to the extent practicable, ASMFC measures included in the Coastal Shark FMP and Addendum I to the Coastal Shark FMP. This alternative is not anticipated to have any short-term, direct impacts on protected resources over the next year or two as it would allow the fishery continue at levels similar to how the fishery has been prosecuted over the past 10 years, which is not anticipated to jeopardize the existence of any protected resource in the next year or two. However, in the long-term, if there are undocumented takes of protected resources occurring, these cumulative takes could result in direct, moderate adverse impacts. This would be a potentially greater concern if the fishery grew and effort increased, which currently would be allowed under alternative F3 as no smooth dogfish quota would be implemented. However, there are no indirect ecological impacts anticipated in the short- or long-term to protected resources as fishing for smooth dogfish is not expected to impact habitat or ecosystem components (*i.e.*, predator/prey relationships) for protected resources, even if the fishery were to increase in the future.

## **4.6 Environmental Justice**

Executive Order 12898 requires agencies to identify and address disproportionately high and adverse environmental effects of its regulations on minority and low-income populations.

To determine whether environmental justice concerns exist, the demographics of the affected area should be examined to ascertain whether minority populations and low-income populations are present. If so, a determination must be made as to whether implementation of the alternatives may cause disproportionately high and adverse human health or environmental effects on these populations.

In addition to the community profile information found in the 2006 Consolidated HMS FMP (Chapter 9), a recent report was completed by MRAG Americas, and Jepson (2008) titled “Updated Profiles for HMS Dependent Fishing Communities” (Appendix E of Amendment 2 to the 2006 Consolidated HMS FMP). This report includes updated community profiles and new social impacts assessments for HMS fishing communities along the Atlantic and Gulf of Mexico coasts. The communities of Dulac, Louisiana and Fort Pierce, Florida have significant populations of Native Americans and African-Americans, respectively. The 2000 Census data indicates that Native Americans made up 39 percent of the Dulac population, specifically the Houma Indians, which is not a federally recognized tribe. About 30 percent of the Dulac population was living below poverty level in 2000. In 2000, African-Americans were about 41 percent of the Fort Pierce, Florida population with about 30 percent of the entire Fort Pierce population living below the poverty line. These two communities also have significant populations of low-income residents. In addition to Dulac and Fort Pierce, there is a diffuse of low-income, minority Vietnamese-American population in Louisiana, actively participating in the PLL fishery, and commuting to fishing ports, but not living in “fishing communities” as defined by the Magnuson-Stevens Act and identified in Chapter 9 of this document. Each of the management alternatives in Chapter 4 includes an assessment of the potential social and economic impacts associated with the proposed alternatives. The preferred alternatives were selected to minimize economic impacts and provide for the sustained participation of fishing communities, while taking the necessary actions to rebuild overfished fisheries as required by the Magnuson-Stevens Act. More in-depth information about potential social impacts of each preferred alternatives is briefly described below with detailed information provided earlier in this chapter. Demographic data indicate that coastal counties with fishing communities are variable in terms of social indicators like income, employment, and race and ethnic composition.

The preferred alternative A6, to establish a new non-blacknose SCS quota and a blacknose shark commercial quota, would have some negative economic and social impacts throughout the fishery. NMFS does not anticipate that these effects would fall disproportionately on minority or low-income populations in the affected communities discussed above. Alternative A6 was designed to reduce quotas necessary to rebuild and end overfishing of blacknose sharks. Quota reductions were chosen instead of large time-area closures or complete fishery closures as a quota reduction would meet the conservation goals necessary to rebuild blacknose sharks and allow data collections while mitigating some of the significant economic impacts that are necessary and expected under these alternatives to reduce fishing mortality as prescribed by recent stock assessments. NMFS believes this alternative would provide an appropriate balance between positive ecological impacts that must be achieved in order to rebuild and end overfishing on overfished stocks, while minimizing the severity of negative economic impacts that would occur as a result of these measures.

The other preferred alternatives are not anticipated to have any significant negative social or economic impacts on minority or low-income populations in the communities discussed above. Alternatives B1 and D1 would maintain the status quo for authorized commercial gear in the shark fishery and would maintain the SCS recreational retention and size limits. Under preferred alternatives C5, C6, E3, and E4, NMFS would work in at the international level to develop measures for implementation by other nations to end overfishing in addition to promoting domestically the live release of shortfin mako sharks in both the commercial and recreational sectors. These alternatives would not change the current commercial harvest regulations for shortfin mako sharks. Finally, under preferred alternative F2, NMFS would implement a federal permit requirement for smooth dogfish. This alternative would not change the retention limits for this fishery so there would not be any disproportionate negative social or economic impacts on minority or low-income populations.

#### **4.7 Coastal Zone Management Act**

The Coastal Zone Management Act (CZMA) requires that Federal agency activities be consistent to the maximum extent practicable with the enforceable policies of federally-approved state coastal management programs (CMPs). NMFS has determined that the preferred alternatives would be implemented in a manner consistent to the maximum extent practicable with the enforceable policies of the coastal states in the Atlantic, Gulf of Mexico, and Caribbean that have federally approved CMPs. In July 2009, NMFS provided all coastal states along the eastern seaboard and the Gulf of Mexico (21 states), including Puerto Rico and the U.S. Virgin Islands with a copy of the proposed rule and draft EIS for Amendment 3 to the Consolidated HMS FMP. Under 15 C.F.R. § 930.41, states and/or U.S. territories have 60 days to respond after the receipt of the consistency determination and supporting materials. States can request an extension of up to 15 days. If a response is not received within those time limits, NMFS can presume concurrence (15 C.F.R. § 930.41(a)). Seven states replied within the response time period that the proposed regulations were consistent, to the extent practicable, with the enforceable policies of their CMPs (Connecticut, New Jersey, Pennsylvania, Delaware, Virginia, Mississippi, and Puerto Rico). Another ten states (Maine, New Hampshire, Rhode Island, Massachusetts, New York, Maryland, South Carolina, Alabama, Louisiana, and the U.S. Virgin Islands) did not respond within the response time period, nor did they request an extension in the comment period; therefore, NMFS presumes their concurrence. The State of Florida, the State of Georgia, and the State of North Carolina replied that the proposed rule was not consistent with the enforceable policies of their respective state's coastal zone management program.

##### *State of Florida*

The State of Florida, in its October 9, 2009, CZMA consistency letter to NMFS, stated that the recreational SCS preferred alternative in the DEIS, Alternative D4, was not consistent with the state's enforceable policies because the state already has in place, adequate protection of blacknose sharks in state waters. Based on public comment and because the No Action alternative is effectively the same as a prohibition of blacknose sharks due to the current 54 inch size limit in the recreational fishery, NMFS no longer prefers alternative D4 in the FEIS. The preferred alternative in the FEIS is D1, the status quo alternative. The State of Florida's CZMA consistency letter noted that if NMFS changed the preferred alternative to D1, Amendment 3

would be consistent with the state's CMP. Therefore, NMFS considers the actions in the FEIS to be consistent with the State of Florida's CMP.

### *State of Georgia*

The State of Georgia, in its September 10, 2009, CZMA consistency letter to NMFS, stated that if NMFS changed the commercial gear preferred alternative and continued to allow gillnet gear in the South Atlantic shark fishery, the action would not be consistent with the State of Georgia's enforceable policies. Georgia's letter also stated that it did not support preferred alternative D4 and instead recommended alternative D1. As detailed in Chapters 2 and 4, NMFS altered the preferred alternative in the FEIS to maintain the current blacknose shark recreational size and retention limits (D1) and to allow gillnet gear in all areas of the Atlantic shark fishery. Due to the change of the commercial gear preferred alternative, the State of Georgia objects to the consistency determination because of the continuing operation of the shark gillnet fishery in federal waters, which could potentially impact resources shared by adjacent state waters. Additionally, the State of Georgia has concerns regarding the impact of the shark gillnet fishery on threatened and endangered species. The data currently available for the shark gillnet fishery indicate low rates of bycatch and bycatch mortality of protected species and other finfish in this fishery compared to other HMS fisheries (see Section 3.4.2).

While NMFS also acknowledges the concern of protected resources interactions with gillnet gear, under the Magnuson-Stevens Act's (16 U.S.C. § 1801 et seq.) NSs, the Agency must, among other things, implement conservation and management measures to prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery; base its actions upon the best scientific information available; manage stocks throughout their range to the extent practicable; minimize adverse economic impacts on fishing communities to the extent practicable; and minimize bycatch and bycatch mortality to the extent practicable. 16 U.S.C. §§ 1851(a)(1), (2), (3), (8), and (9). In the preparation of this document, NMFS performed an extensive analysis on the SCS gillnet fishery using updated average blacknose shark weights from the SEFSC. This analysis concluded that SCS gillnet fishermen were able to selectively target certain SCS species while avoiding blacknose sharks. Furthermore, when the shark gillnet fishery catches blacknose sharks, they are usually larger, more mature individuals than those caught in other gears. These two findings, in concert, make for less significant ecological benefits of prohibiting gillnets than previously believed. The significant adverse economic and social impacts resulting from a geographical ban on gillnets in the shark fishery outweigh the ecological benefits to blacknose sharks. Therefore, NMFS is not prohibiting the use of gillnet gear at this time. This finding is consistent with NS 2 which requires that management measures be based on the best scientific information available including the BiOp. Based on this information from NMFS' administrative record and combined with the Magnuson-Stevens Act legal requirements noted in this paragraph, under the CZMA and NOAA regulations, NMFS is consistent to the maximum extent practicable with Georgia's CMP policies.

On May 5, 2008, the Southeast Regional Office of Protected Resources Division completed a BiOp regarding the actions under Amendment 2 to the Consolidated HMS FMP. The BiOp, concluded that the continued authorization of the gillnet fishery was likely to adversely affect, but not likely to jeopardize the continued existence of, green, Kemp's ridley, leatherback, and loggerhead sea turtles and smalltooth sawfish. The opinion also concluded that

marine mammals, the Gulf of Maine Atlantic salmon DPS, shortnose sturgeon, Gulf sturgeon, and right whale critical habitat were not likely to be adversely affected by the action. The Atlantic shark fishery continues to be in compliance with the terms and conditions of the ITS in the 2008 BiOp. The SCS measures in Amendment 3 are expected to reduce fishing effort and reduce the fishery's impact on ESA-listed species in the action area.

Currently, all shark gillnet vessels are required to carry VMS and are subject to observer coverage during and outside of the right whale calving season. In addition, more stringent management measures were put in place under a final rule for the Atlantic Large Whale Take Reduction Plan (ALWTRP) (72 FR 34632, June 25, 2007) that prohibits all gillnet fishing from November 15 through April 15 of each year in Federal waters off Georgia. NMFS would continue to work with existing take reduction teams and relevant Fishery Management Councils to examine methods of reducing bycatch. Thus, NMFS finds that the final regulations implemented in this amendment are consistent with Georgia's CMP to the maximum extent practicable.

#### *State of North Carolina*

The State of North Carolina, in its September 15, 2009, CZMA consistency letter to NMFS, stated that the actions will only be consistent with the state's enforceable policies if NMFS selects alternatives A2 (In the DEIS, this alternative would establish a new SCS quota of 392.5 mt dw and a blacknose commercial quota of 13.5 mt dw) and F1 (No Action. Do not add smooth dogfish under NMFS management) as the preferred alternatives in the FEIS. The State of North Carolina determined that any alternative other than A2 would disproportionately impact the state by removing fair and equitable distribution of SCS quota. As detailed in Chapter 2, NMFS has changed the preferred alternative in the FEIS to allow for a restricted blacknose quota, but a higher non-blacknose SCS quota that is equal to the average annual landings of the non-blacknose SCS. The preferred alternative in this FEIS, alternative A6, includes a higher blacknose shark quota (19.9 mt dw) than that favored by the State of North Carolina (13.5 mt dw). The non-blacknose shark SCS quota in alternative A6 (221.6 mt dw) is not as high as that favored by the State of North Carolina (392.5 mt dw) but it is equal to the average annual landings and should therefore not restrict fishing for these species.

In the preparation of this document, NMFS performed an extensive analysis on the SCS gillnet fishery using updated average blacknose shark weights from the SEFSC. This analysis concluded that SCS gillnet fishermen were able to selectively target certain SCS species while avoiding blacknose sharks. Furthermore, when the shark gillnet fishery catches blacknose sharks, they are usually larger, more mature individuals than those caught in other gears. These two findings, in concert, make for less significant ecological benefits of prohibiting gillnets than previously believed. The significant negative economic and social impacts resulting from a geographical ban on gillnets in the shark fishery outweigh the ecological benefits to blacknose sharks. For these reasons, NMFS is not prohibiting the use of gillnet gear at this time. This finding is consistent with NS 2 which requires that management measures be based on the best scientific information available including the BiOp. Therefore, NMFS believes the preferred alternative in the FEIS is consistent with the State of North Carolina's CZMA policies based on the higher non-blacknose SCS quota.

The State of North Carolina also determined that the smooth dogfish preferred alternative, Alternative F2, was inconsistent with the states enforceable policies. The State's letter maintained that any alternative other than F1 would be inconsistent because the implementing measures would be contrary to the measures in state waters and the ASMFC smooth dogfish measures, particularly in a fishery that primarily occurs in state waters. Based upon a July 6, 2009, memo to the ASMFC, data from North Carolina's Trip Ticket program shows that the smooth dogfish fishery is almost equally divided between state and federal waters off the North Carolina coast with 46 percent of the catch occurring in federal waters. NMFS recognizes that some of the smooth dogfish measures included in the FEIS are inconsistent with the ASMFC plan. However, NMFS chose not to mirror the ASMFC smooth dogfish measures because the ASMFC plan contains some provisions that NMFS cannot implement and does not include others that NMFS must implement.

On May 6, 2009, the ASMFC approved a smooth dogfish Addendum to the Atlantic Coastal Sharks FMP for public comment. Included within this Addendum is an exception for smooth dogfish to allow at-sea processing (*i.e.*, removal of shark fins while still onboard a fishing vessel), removal of recreational retention limits for smooth dogfish, and removal of the two hour net-check requirement for shark gillnets. The at-sea processing would require a five-percent fin to carcass ratio but would allow for the removal of fins at sea. The allowance for the removal of shark fins while still on board a fishing vessel and the removal of the two hour net-check requirement is inconsistent with current federal regulations. NMFS considers the requirement to maintain shark fins naturally attached through offloading to be necessary to minimize impacts on protected resources and to prevent shark finning. NMFS recently implemented the fins naturally attached regulation for all Atlantic sharks for enforcement and species identification reasons and would not want to open a loophole that would hinder enforcement. ASMFC has not established a quota for the smooth dogfish fishery and, as noted above, NMFS is required to establish ACLs and AMs under the Magnuson-Stevens Act. In addition, ASMFC has not established a permitting requirement. NMFS believes that permitting is the first step to gaining information about the fishery and quantifying the universe of participants. Based on NMFS' existing legal requirements related to shark fins, NMFS is consistent to the maximum extent practicable.

During the DEIS public comment period, the smooth dogfish fishery participants noted significant concern regarding the fins attached requirement. NMFS believes that requiring that fins remain attached to the carcass is an important component of shark management. However, in order to mitigate potential impacts to the smooth dogfish fishery participants, NMFS is delaying implementation of the management measures in the preferred alternative until the beginning of the fishing season in 2012. The delayed implementation would allow NMFS time to continue outreach efforts with fishery participants and the ASMFC to develop more fully this issue and to ensure that federal and state regulations are consistent to the extent practicable. For these reasons, NMFS finds the preferred alternatives in the FEIS, alternative A6 and alternative F2 to be consistent to the maximum extent practicable with the enforceable policies of the State of North Carolina's CMP.

## **4.8 Cumulative Impacts**

Cumulative impacts are the impacts on the environment, which result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR § 1508.7). A cumulative impact includes the total effect on a natural resource, ecosystem, or human community due to past, present, and reasonably foreseeable future activities or actions of federal, non-federal, public, and private entities. Cumulative impacts may also include the effects of natural processes and events, depending on the specific resource in question. Cumulative impacts include the total of all impacts to a particular resource that have occurred, are occurring, and would likely occur as a result of any action or influence, including the direct and reasonably foreseeable indirect impacts of a federal activity. The goal of this section is to describe the cumulative ecological, economic and social impacts of past, present and reasonably foreseeable future actions with regard to the management measures presented in this document. Table 4.13 compares the cumulative impacts of the alternatives considered in the EIS.

**Table 4.13 Comparison of the impacts of analyzed alternatives.**

Symbol Key:

- Neutral Impacts
- ⊙+ Minor Beneficial Impacts
- ⊘+ Moderate Beneficial Impacts
- + Significant Beneficial Impacts
- ⊙- Minor Adverse Impacts
- ⊘- Moderate Adverse Impacts
- ⊗ Significant, but Mitigated to < Significant, Adverse Impacts
- Significant Adverse Impacts

Alternative	Quality	Timeframe	Ecological	Protected Resources	Socioeconomic
<b>A1</b> No Action. Maintain the existing SCS quota and species complex	Direct	Short-term	⊙-	○	○
		Long-term	●-	○	⊙-
	Indirect	Short-term	○	○	○
		Long-term	⊘-	○	⊙-
	Cumulative			⊙-	○
<b>A2</b> Establish a new SCS quota of 221.6 mt dw and a blacknose commercial quota of 12.1 mt dw	Direct	Short-term	○	○	⊘-
		Long-term	●+	⊙+	⊙-
	Indirect	Short-term	○	○	⊙-
		Long-term	⊘+	○	○
	Cumulative			⊙+	⊙+
<b>A3</b> Establish a new SCS quota of 110.8 mt dw and a blacknose commercial quota of 19.9 mt dw; allow all current authorized gears for sharks	Direct	Short-term	○	⊙+	⊘-
		Long-term	●+	⊘+	●-
	Indirect	Short-term	⊙+	⊙+	⊘-
		Long-term	⊘+	⊘+	⊙-
	Cumulative			⊘+	⊘+
<b>A4</b> Establish a new SCS quota of 55.4 mt dw and a blacknose commercial quota of 15.9 mt dw; remove shark gillnet gear as an authorized gear for sharks	Direct	Short-term	⊙+	⊙+	⊘-
		Long-term	●+	⊘+	●-
	Indirect	Short-term	⊙+	⊙+	⊘-
		Long-term	⊘+	⊘+	⊙-
	Cumulative			⊘+	⊘+
<b>A5</b> Close the SCS fishery	Direct	Short-term	⊘+	⊙+	●-
		Long-term	●+	⊘+	●-
	Indirect	Short-term	⊘+	⊙+	⊘-
		Long-term	●+	⊘+	⊘-
	Cumulative			●+	⊘+
<b>A6</b> Establish a new SCS quota of 221.6 mt dw and a blacknose commercial	Direct	Short-term	○	○	○
		Long-term	●+	⊙+	⊙-

Alternative	Quality	Timeframe	Ecological	Protected Resources	Socioeconomic
<i>quota of 19.9 mt dw; allow all current authorized gears for sharks – Preferred Alternative</i>	Indirect	Short-term	○	○	○
		Long-term	⊘ <sub>+</sub>	⊙ <sub>+</sub>	○
	Cumulative		⊙ <sub>+</sub>	⊙ <sub>+</sub>	⊙ <sub>-</sub>
<b>B1</b> No Action. Maintain current authorized gears for commercial shark fishing – Preferred Alternative	Direct	Short-term	○	○	○
		Long-term	○	○	○
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		○	○	○
<b>B2</b> Close shark gillnet fishery; remove gillnet gear as an authorized gear type for commercial shark fishing	Direct	Short-term	⊙ <sub>-</sub>	⊙ <sub>+</sub>	⊙ <sub>-</sub>
		Long-term	⊘ <sub>-</sub>	⊙ <sub>+</sub>	⊘ <sub>-</sub>
	Indirect	Short-term	⊙ <sub>-</sub>	○	⊙ <sub>-</sub>
		Long-term	⊘ <sub>-</sub>	○	⊘ <sub>-</sub>
	Cumulative		⊘ <sub>-</sub>	⊙ <sub>+</sub>	⊘ <sub>-</sub>
<b>B3</b> Close the gillnet fishery to commercial shark fishing from South Carolina south, including the Gulf of Mexico and the Caribbean Sea	Direct	Short-term	⊙ <sub>-</sub>	⊙ <sub>+</sub>	⊙ <sub>-</sub>
		Long-term	⊘ <sub>-</sub>	⊙ <sub>+</sub>	⊘ <sub>-</sub>
	Indirect	Short-term	⊙ <sub>-</sub>	○	⊙ <sub>-</sub>
		Long-term	⊘ <sub>-</sub>	○	⊘ <sub>-</sub>
	Cumulative		⊘ <sub>-</sub>	⊙ <sub>+</sub>	⊘ <sub>-</sub>
<b>C1</b> No Action. Keep shortfin mako sharks in the pelagic shark species complex and maintain the quota	Direct	Short-term	⊙ <sub>-</sub>	○	○
		Long-term	⊙ <sub>-</sub>	○	○
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		⊙ <sub>-</sub>	○	○
<b>C2</b> Remove shortfin mako sharks from pelagic shark species quota and establish a shortfin mako quota	Direct	Short-term	○	○	⊙ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	○	○
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		○	○	○
<b>C3</b> Remove shortfin mako sharks from pelagic shark species complex and place this species on the prohibited shark species list	Direct	Short-term	○	○	⊘ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	○	⊘ <sub>-</sub>
	Indirect	Short-term	○	○	○
		Long-term	○	○	○

Alternative	Quality	Timeframe	Ecological	Protected Resources	Socioeconomic
	Cumulative		○	○	⊙ <sub>-</sub>
<b>C4a</b> Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of female shortfin mako sharks reach sexual maturity or 32 inches interdorsal length (IDL)	Direct	Short-term	○	○	⊙ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	○	⊙ <sub>-</sub>
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		○	○	○
<b>C4b</b> Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of male shortfin mako sharks reach sexual maturity or 22 inches IDL	Direct	Short-term	○	○	⊙ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	○	⊙ <sub>-</sub>
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		○	○	○
<b>C5</b> Take action at the international level to end overfishing of shortfin mako sharks - Preferred Alternative	Direct	Short-term	⊙ <sub>-</sub>	○	○
		Long-term	⊙ <sub>+</sub>	○	⊙ <sub>-</sub>
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		⊙ <sub>+</sub>	○	⊙ <sub>-</sub>
<b>C6</b> Promote the release of shortfin mako sharks brought to fishing vessels alive – Preferred Alternative	Direct	Short-term	⊙ <sub>-</sub>	○	○
		Long-term	⊙ <sub>+</sub>	○	○
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		○	○	○
<b>D1</b> No Action. Maintain the current recreational retention and size limit for SCS- Preferred Alternative	Direct	Short-term	○	○	○
		Long-term	○	○	○
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		⊙ <sub>-</sub>	○	○
<b>D2</b> Modify the minimum recreational size limit for blacknose sharks based on their biology	Direct	Short-term	○	○	⊙ <sub>+</sub>
		Long-term	⊙ <sub>+</sub>	○	⊙ <sub>-</sub>
	Indirect	Short-term	○	○	⊙ <sub>+</sub>
		Long-term	⊙ <sub>+</sub>	○	⊙ <sub>+</sub>
	Cumulative		○	○	⊙ <sub>+</sub>
<b>D3</b> Increase the retention	Direct	Short-term	○	○	⊙ <sub>+</sub>

Alternative	Quality	Timeframe	Ecological	Protected Resources	Socioeconomic
limit for Atlantic sharpnose sharks based on current catches		Long-term	⊗ <sub>-</sub>	○	⊙ <sub>+</sub>
	Indirect	Short-term	⊙ <sub>-</sub>	○	⊙ <sub>+</sub>
		Long-term	⊗ <sub>-</sub>	○	⊙ <sub>+</sub>
	Cumulative		⊗ <sub>-</sub>	○	⊙ <sub>+</sub>
<b>D4</b> Prohibit retention of blacknose sharks in recreational fisheries	Direct	Short-term	○	○	⊙ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	○	⊙ <sub>-</sub>
	Indirect	Short-term	○	○	○
		Long-term	⊙ <sub>+</sub>	○	○
	Cumulative		⊙ <sub>+</sub>	○	⊙ <sub>-</sub>
<b>E1</b> No Action. Maintain the current recreational retention and size limits for shortfin mako sharks	Direct	Short-term	⊙ <sub>-</sub>	○	○
		Long-term	⊙ <sub>-</sub>	○	○
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		⊙ <sub>-</sub>	○	○
<b>E2a</b> Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of female shortfin mako sharks reach sexual maturity or 108 in FL	Direct	Short-term	○	○	⊘ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	○	⊘ <sub>-</sub>
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		○	○	⊙ <sub>-</sub>
<b>E2b</b> Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of male shortfin mako sharks reach sexual maturity or 73 inches FL	Direct	Short-term	○	○	⊘ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	○	⊘ <sub>-</sub>
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		○	○	⊙ <sub>-</sub>
<b>E3</b> Take action at the international level to end overfishing of shortfin mako sharks– Preferred Alternative	Direct	Short-term	⊙ <sub>-</sub>	○	○
		Long-term	⊘ <sub>+</sub>	○	⊘ <sub>-</sub>
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		⊘ <sub>+</sub>	○	○
<b>E4</b> Promote the release of shortfin mako sharks brought to fishing vessels alive – Preferred Alternative	Direct	Short-term	⊙ <sub>-</sub>	○	○
		Long-term	⊙ <sub>+</sub>	○	○
	Indirect	Short-term	○	○	○

Alternative	Quality	Timeframe	Ecological	Protected Resources	Socioeconomic
		Long-term	○	○	○
	Cumulative		○	○	○
<b>E5</b> Prohibit retention of shortfin mako sharks in recreational fisheries (catch and release only)	Direct	Short-term	○	○	⊘
		Long-term	⊙ <sub>+</sub>	○	⊘
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		○	○	⊙
<b>F1</b> No Action. Do not add smooth dogfish under NMFS management	Direct	Short-term	⊙ <sub>-</sub>	⊙ <sub>-</sub>	○
		Long-term	⊘ <sub>-</sub>	⊘ <sub>-</sub>	⊙ <sub>-</sub>
	Indirect	Short-term	⊙ <sub>-</sub>	○	○
		Long-term	⊘ <sub>-</sub>	○	⊙ <sub>-</sub>
	Cumulative		⊙ <sub>-</sub>	⊙ <sub>-</sub>	○
<b>F2</b> Add smooth dogfish under NMFS management and establish a federal permit requirement-Preferred Alternative	Direct	Short-term	○	⊙ <sub>-</sub>	⊗ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	⊙ <sub>-</sub>	○
	Indirect	Short-term	⊙ <sub>+</sub>	○	⊙ <sub>-</sub>
		Long-term	⊘ <sub>+</sub>	⊙ <sub>+</sub>	○
	Cumulative		⊙ <sub>+</sub>	⊙ <sub>+</sub>	⊙ <sub>-</sub>
<b>F2a1</b> Establish a smooth dogfish quota that is equal to the average annual landings from 1998-2007 (950,859 lb dw)	Direct	Short-term	○	○	⊙ <sub>-</sub>
		Long-term	⊘ <sub>+</sub>	⊙ <sub>+</sub>	⊘ <sub>-</sub>
	Indirect	Short-term	○	○	⊙ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	○	⊙ <sub>-</sub>
	Cumulative		⊙ <sub>+</sub>	⊙ <sub>+</sub>	⊙ <sub>-</sub>
<b>F2a2</b> Establish a smooth dogfish quota equal to the maximum annual landings from 1998-2007 (1,270,137 lb dw)	Direct	Short-term	○	○	⊙ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	⊙ <sub>-</sub>
	Indirect	Short-term	○	○	⊙ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	○	⊙ <sub>-</sub>
	Cumulative		⊙ <sub>+</sub>	⊙ <sub>+</sub>	⊙ <sub>-</sub>
<b>F2a3</b> Establish a smooth dogfish quota equal to the maximum annual landings from 1998-2007 plus one standard deviation (1,423,728 lb dw)	Direct	Short-term	○	○	○
		Long-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	⊙ <sub>-</sub>
	Indirect	Short-term	○	○	⊙ <sub>-</sub>
		Long-term	⊙ <sub>+</sub>	○	⊙ <sub>-</sub>
	Cumulative		⊙ <sub>+</sub>	⊙ <sub>+</sub>	⊙ <sub>-</sub>

Alternative	Quality	Timeframe	Ecological	Protected Resources	Socioeconomic
<b>F2a4</b> Establish a smooth dogfish quota equal to the maximum annual landings from 1998-2007 plus two standard deviations (1,577,319 lb dw) – Preferred Alternative	Direct	Short-term	○	○	○
		Long-term	⊙ <sub>+</sub>	⊙ <sub>+</sub>	⊙ <sub>-</sub>
	Indirect	Short-term	○	○	○
		Long-term	⊙ <sub>+</sub>	○	⊙ <sub>-</sub>
	Cumulative		⊙ <sub>+</sub>	⊙ <sub>+</sub>	⊙ <sub>-</sub>
<b>F2b1</b> Establish a separate smooth dogfish set-aside quota for the exempted fishing program– Preferred Alternative	Direct	Short-term	○	○	○
		Long-term	○	○	○
	Indirect	Short-term	○	○	○
		Long-term	○	○	○
	Cumulative		○	○	○
<b>F2b2</b> Establish a smooth dogfish set-aside quota for the exempted fishing program and add it to the current 60 mt ww set-aside quota for the exempted fishing program	Direct	Short-term	○	○	○
		Long-term	⊙ <sub>-</sub>	○	○
	Indirect	Short-term	○	○	○
		Long-term	⊙ <sub>-</sub>	○	○
	Cumulative		⊙ <sub>-</sub>	○	○
<b>F3</b> Add smooth dogfish under NMFS management and mirror management measures implemented in the ASMFC Interstate Shark FMP	Direct	Short-term	⊙ <sub>-</sub>	⊙ <sub>-</sub>	○
		Long-term	⊘ <sub>-</sub>	⊘ <sub>-</sub>	⊙ <sub>-</sub>
	Indirect	Short-term	⊙ <sub>-</sub>	○	○
		Long-term	⊘ <sub>-</sub>	○	⊙ <sub>-</sub>
	Cumulative		⊙ <sub>-</sub>	⊙ <sub>-</sub>	○

#### 4.9 Past, Present, and Reasonably Foreseeable Actions

As discussed in Section 3.1, NMFS has taken a number of actions in the past in order to, among other things, rebuild overfished and prevent overfishing of Atlantic sharks. These actions have included FMPs, FMP amendments, and framework actions. The goals and objectives of these past rules are summarized in Section 3.1. NMFS is required to take similar actions in this document, and can reasonably expect to implement regulations in the future to address the management and conservation of Atlantic sharks. The need and objectives of this document are described in earlier sections, particularly Chapter 1, and are not repeated here.

Other recent actions within HMS fisheries that may affect shark fishermen both directly and indirectly include Amendment 2 to the 2006 Consolidated HMS FMP that changed quotas, retention limits, and authorized species for the commercial shark fishery (corrected rule: 73 FR 40658; July 15, 2008), Amendment 1 to the 2006 Consolidated HMS FMP that amended essential fish habitat designations for HMS (Notice of Availability of final EIS: 74 FR 28018;

June 12, 2009), an inseason action (or temporary rule) that closed the Gulf of Mexico commercial non-sandbar LCS fishery (74 FR 26803; June 4, 2009); an inseason action (or temporary rule) that closed the non-sandbar LCS fisheries in the shark research fishery and Atlantic region (74 FR 30479); an inseason action (or temporary rule) that closed the 2009 commercial sandbar shark research fishery (74 FR 51241; October 6, 2009); implementation of the Atlantic Pelagic Longline Take Reduction Plan (74 FR 23349; May 19, 2009) to reduce protected species interactions in HMS fisheries; an inseason action (or temporary rule) that closed the commercial porbeagle shark fishery for the remainder of 2008 (73 FR 68361; November 18, 2008); a rule authorizing greenstick gear for the harvest of Atlantic tunas and a requirement for PLL and BLL HMS fishermen to possess and use an authorized sea turtle control device (73 FR 54721; September 23, 2008); a rule that amends the regulations governing the Atlantic tunas longline LAPs and amends the workshop attendance requirements for businesses issued Atlantic shark dealer permits (73 FR 38144; July 3, 2008); a rule establishing the 2010 shark fishing season specifications (75 FR 250; January 5, 2010); and a rule modifying permitting and reporting requirements for the HMS International Trade Permit program (73 FR 31380; June 2, 2008).

The following past and past and ongoing actions would have varying degrees of synergistic impacts on the human environment when considered in conjunction with Amendment 3 to the 2006 Consolidated HMS FMP:

- Amendment 2 to the 2006 Consolidated HMS FMP changed quotas, retention limits, and authorized species for the commercial shark fishery. Changes in this amendment could result in beneficial, cumulative, ecological impacts for SCS by decreasing fishing mortality, but reductions in SCS quotas could lead to adverse, cumulative socioeconomic impacts when considered in conjunction with Amendment 2 to the 2006 Consolidated HMS FMP.
- Amendment 1 to the 2006 Consolidated HMS FMP amended essential fish habitat designations for HMS. This is not expected to have any additional impacts with the implementation of Amendment 3 except for the additional smooth dogfish EFH determination.
- The temporary closure of the commercial non-sandbar LCS fishery in the Gulf of Mexico region is not expected to have any ecological or socioeconomic impacts in conjunction with Amendment 3 to the 2006 Consolidated HMS FMP as the fishery reopened on January 5, 2010 with quotas adjusted for any 2009 overharvest of non-sandbar LCS (75 FR 250).
- The temporary closure of the commercial non-sandbar LCS fishery in the shark research fishery and Atlantic region is not expected to have any ecological or socioeconomic impacts in conjunction with Amendment 3 to the 2006 Consolidated HMS FMP as the non-sandbar LCS research fishery reopened on January 5, 2010 and the non-sandbar LCS fishery in the Atlantic region will reopen on July 15, 2010 with quotas adjusted for any 2009 overharvest of non-sandbar LCS (75 FR 250).
- The temporary closure of the sandbar shark research fishery is not expected to have any ecological or socioeconomic impacts in conjunction with Amendment 3

to the 2006 Consolidated HMS FMP as the fishery reopened on January 5, 2010 (75 FR 250).

- The Atlantic Pelagic Longline Take Reduction (APLTR) final rule may have beneficial, cumulative, ecological and adverse, cumulative, socioeconomic impacts in conjunction with Amendment 3 to the 2006 Consolidated HMS FMP, if restrictions on maximum pelagic longline mainline length in the mid-Atlantic Bight reduce commercial access to sharks. The cumulative ecological impacts may be beneficial for pelagic sharks if the APLTR rule results in decreasing fishing mortality, but cumulative socioeconomic impacts may be adverse if pelagic shark landings are reduced.
- The temporary rule closing the commercial porbeagle fishing season is not expected to have any ecological or socioeconomic impacts in conjunction with Amendment 3 to the 2006 Consolidated HMS FMP as the fishery has reopened in 2009 with quotas adjusted for the 2008 overharvest of porbeagle sharks.
- The rule authorizing greenstick gear for the harvest of Atlantic tunas and a requirement for PLL and BLL HMS fishermen to possess and use an authorized sea turtle control device should not increase the mortality rates of Atlantic tunas and should help in the safe release of sea turtles caught in PLL and BLL gear. The authorization of greenstick gear creates more economic opportunities to harvest Atlantic tunas. This is not expected to have any additional impacts with the implementation of Amendment 3.
- The rule that amends the regulations governing the Atlantic tunas longline LAPs and amends the workshop attendance requirements for businesses issued Atlantic shark dealer permits slightly modifies requirements that were already in place. Therefore, this is not expected to have any additional impacts with the implementation of Amendment 3.
- The rule that establishes the 2010 shark fishing season specifications adjusts quotas and opening dates for the 2010 fishing season for sandbar sharks, non-sandbar LCS, SCS, and pelagic sharks based on any over- and/or underharvests experienced during the 2008 and 2009 Atlantic commercial shark fishing seasons. This rule may have, cumulative, adverse, socioeconomic impacts for some SCS fishermen by delaying the opening of the SCS fishing season until the implementation of Amendment 3. The rule also delays the opening of the LCS fishery in the Atlantic region until July 15, 2010, which may result in varied cumulative socioeconomic impacts (ranging from beneficial to adverse) depending on LCS availability within the region.
- Finally, the rule modifying permitting and reporting requirements for the HMS ITP program slightly modifies requirements that were already in place. Therefore, this is not expected to have any additional impacts with the implementation of Amendment 3.

In addition, reasonably foreseeable future actions that may result in additional incremental cumulative impacts include: modifications to swordfish and Atlantic bluefin tuna management measures; establishing reporting requirements for recreational and commercial U.S. Caribbean HMS fisheries, and changes to HMS permitting requirements recently announced in an Advanced Notice of Proposed Rulemaking (74 FR 26174; June 1, 2009). These are measures

that, while not all directly related to sharks, could be implemented in other rulemakings and affect participants in shark fisheries in conjunction with the preferred alternatives selected in this proposed amendment. Such actions would have varied effects on shark fishermen. Additional actions that reduce fishing opportunities could have cumulative, adverse, socioeconomic impacts on shark fishermen in conjunction with Amendment 3 to the 2006 Consolidated HMS FMP. However, other actions that address regional issues in the Caribbean region could increase fishing opportunities and have cumulative, beneficial, socioeconomic impacts on fishermen, which could help mitigate some of the cumulative adverse socioeconomic impacts under Amendment 3 to the Consolidated HMS FMP.

In general, preferred alternatives for SCS would implement quotas necessary to rebuild and stop overfishing of blacknose sharks, and mitigate some of the socioeconomic impacts that are necessary and expected to reduce fishing mortality as prescribed by recent stock assessments. Preferred alternatives for pelagic sharks would include ending overfishing internationally and promoting the live release of shortfin mako sharks. Cumulative impacts of these alternatives could have moderate beneficial or neutral ecological impacts, and moderate adverse or neutral socioeconomic impacts. Preferred alternatives for smooth dogfish include establishing an HMS permit requirement to possess smooth dogfish, and setting annual quotas for the commercial fishery and scientific research. These alternatives are anticipated to have minor beneficial or neutral ecological impacts, and minor negative or neutral adverse socioeconomic impacts. While NMFS has evaluated the cumulative ecological and socioeconomic impacts of these preferred alternatives, NMFS also evaluated how other non-HMS fisheries may be impacted by the preferred alternative suite. In particular, NMFS evaluated other fisheries that fishermen currently have permits for, shark fishermen's ability to enter other fisheries, and the subsequent impacts those fisheries might experience as a result of redirected shark fishing effort.

As part of this analysis, NMFS investigated the different types of commercial permits that directed and incidental shark permit holders currently have in addition to their HMS permits (see Table 3.26). NMFS found that many directed and incidental shark permit holders also have Gulf of Mexico reef fish, dolphin/wahoo, mackerel (including king and Spanish mackerel), South Atlantic snapper/grouper commercial permits, and non-HMS Charter/Headboat permits. A few fishermen also have lobster permits. NMFS also evaluated the ability of shark fishermen to move into these other fisheries (*i.e.*, Gulf of Mexico reef fish, dolphin/wahoo, mackerel, and South Atlantic snapper/grouper fisheries) as a result of quota and retention limit reductions in the Atlantic shark fishery under the preferred alternatives. Shark fishermen may also participate in shark fisheries in state waters or may participate in other HMS fisheries for which they may already possess permits (*i.e.*, swordfish). Table 3.26 includes vessels that possess swordfish permits in addition to commercial shark permits. An overview of each fishery is listed below, and the cumulative ecological and socioeconomic impacts of the preferred alternative, including impacts of any redistributed effort to other fisheries, are discussed below.

#### Gulf of Mexico Reef Fish Fishery

The GMFMC originally established the Gulf of Mexico Reef Fish FMP in 1984. Thirty amendments have been made to this plan and currently Amendment 31 is under development.

A Gulf of Mexico commercial reef fish vessel permit allows the harvest and sale of all reef fish listed in the Reef Fish FMP under quota (where applicable) and in excess of the bag limits (where applicable), except goliath grouper (all harvest prohibited), Nassau grouper (all harvest prohibited), and red snapper. Fishermen wanting to harvest and sell red snapper must also possess individual fishing quota (IFQ) shares. Issuance of new reef fish permits is under a moratorium. Access to this fishery is limited to existing permits holders. However, existing permits are transferable. As of November 5, 2009, shark directed and incidental permit holders possessed 112 Gulf of Mexico reef fish permits (Table 3.26). There are 93 Gulf of Mexico reef fish permits held by shark permitted vessels are concentrated in Florida, which represent approximately 83 percent of the total number of Gulf of Mexico reef fish permits held by commercial shark permit holders.

A portion of the reef fish permit holders also possess IFQ shares, which allow them to land red snapper in addition to other reef fish. Anyone commercially fishing for red snapper now must possess an IFQ allocation and follow the established reporting protocol. Quota shares are freely transferable to any other reef fish permit holders during the first five years following implementation of the IFQ program and then to anyone thereafter. Shark permit holders that also possess a reef fish permit, but did not receive an IFQ allocation will likely find that it would be costly to attain such an allocation.

The Gulf of Mexico Reef Fish FMP authorizes the use of longline, hook and line, handline, bandit gear, rod and reel, buoy gear, spear, powerhead, cast net, and trawl. There is a 6,000 lb gutted weight trip limit for all groupers, deep-water and shallow-water, combined. In January 2008, NMFS published a final rule implementing the Joint Reef Fish Amendment 27/Shrimp Amendment 14. This amendment reduced the commercial red snapper quota to 2.55 million pounds (mp) and a recreational quota of 2.45 mp between 2008 and 2010. The amendment also reduced the commercial minimum size limit to 13 inches total length, requires the use of non-stainless steel circle hooks, venting tools, and dehooking devices when fishing for reef fish, establish a red snapper bycatch mortality reduction goal for the shrimp trawl fishery, and, if necessary, shrimp fishery seasonal closures if the reduction target is not met.

Gulf of Mexico commercial grouper and tilefish fishermen in December 2008 approved a referendum that allowed the Council to approve Amendment 29 to the Reef Fish FMP in January 2009. The final rule was published on August 31, 2009 (74 FR 44732), and established a commercial IFQ management program for grouper and tilefish, which will become effective on January 1, 2010. Initial allocation of quota is based on a permit's landings history from 1999 and 2004.

The GMFMC submitted Amendment 30B to the Reef Fish FMP to NMFS in August 2008 for approval. An interim rule became effective on January 1, 2009, and set seasonal closures, size limits, and catch quotas for the commercial and recreational grouper fisheries. The final rule for Amendment 30B was published on April 16, 2009, and includes reducing the recreational aggregate grouper and gag grouper bag limit, increasing the recreational red grouper bag limit, decreasing the commercial red grouper minimum size, increasing the commercial red grouper closure, eliminating the commercial fishing season closure, and eliminates the end date for the Madison-Swanson and Steamboat Lumps marine reserves. A seasonal closure area for

recreational and commercial fishing from January 1 to April 30, “The Edges”, was removed from the Amendment 30B final rule because of a error contained in the proposed rule and was proposed in separate rule on April 17, 2009 (74 FR 17812). NMFS implemented an emergency rule (74 FR 20229) that bans BLL fishing shoreward of 50 fathoms east of Cape San Blas, FL from May 18, 2009, to October 28, 2009, to reduce sea turtle bycatch in the GOM BLL reef fish fishery. An interim action was taken in a rule on October 21, 2009 (74 FR 53891) that prohibits the use of bottom longline gear for the harvest of reef fish shoreward of a line approximating the 35–fathom depth contour in the eastern Gulf of Mexico and limits bottom longline vessels operating in the reef fish fishery east of longitude 85°30’W to 1,000 hooks onboard, of which only 750 may be actively fished or rigged for fishing. This action was taken to reduce the incidental take of sea turtles until the implementation of Amendment 31, which is targeted for May 2010.

Approximately 23 percent of all shark permit holders (directed and incidental combined) already possess the LAPs necessary to participate in the Gulf of Mexico reef fish fishery. Of these, the Agency did not estimate the number of vessels that were selected to participate in the red snapper fishery since the inception of an IFQ program for that fishery because permits to participate in this fishery are no longer being issued. Since the fishery is limited access and has extensive measures in place to control effort and harvest levels, it is not likely that shark fishermen would be able to compensate all potential losses from reductions in quota and retention limits proposed for sharks solely by transferring effort to the Gulf of Mexico reef fish fishery.

#### Dolphin/Wahoo Fishery

In the Gulf of Mexico, dolphin is included in the management unit under the Coastal Migratory Pelagic Resources FMP, and a charter/headboat vessel permit is required to fish for or possess dolphin in the Gulf of Mexico. Otherwise, there are no regulations controlling the harvest of these species in the Gulf of Mexico.

In the South Atlantic, historically, the dolphin/wahoo fishery has been a recreational fishery (NMFS, 2003). However, during the 1990s, commercial landings in the Atlantic Ocean increased, due in part to an increasing number of pelagic longliners targeting dolphin (NMFS, 2003). As a result, the SAFMC, in cooperation with the MAFMC and NEFMC, developed a comprehensive FMP for both dolphin and wahoo in the Atlantic Ocean (NMFS, 2003). This FMP was approved in December of 2003. The final rule implementing the regulations in this FMP was published on May 27, 2004 (69 FR 30235). Owing to the significant importance of the dolphin/wahoo fishery to the recreational fishing community in the Atlantic, the overall goal of the FMP was to adopt a precautionary and risk-averse approach to management that set harvest limits based on the status quo at that time, which was average catch and effort levels from 1993 to 1997 (NMFS, 2003). These limits were implemented to deter shifts in the historical PLL fisheries for sharks, tunas, and swordfish or expansions into nearshore coastal waters to target dolphin, which could create user conflicts and possible localized depletion in abundance (NMFS, 2003).

As such, the dolphin/wahoo fishery is an open access fishery where people can purchase a vessel, dealer, or operator permit in the South Atlantic. Operators of commercial vessels,

charter vessels, and headboats in the South Atlantic that fish south of 39° N. Latitude are required to have a federal vessel permit for dolphin/wahoo and must have and display operator permits. There is no trip limit for dolphin for a vessel with a commercial federal vessel permit. However, there is a 500 pound commercial trip limit for wahoo for vessels with such a permit. For commercially permitted vessels fishing north of 39° N. Latitude that do not have a federal commercial vessel permit for dolphin/wahoo, there is a trip limit of 200 pounds combined of dolphin and wahoo. In addition, there is a 20 inch fork length minimum size limit for dolphin off the coasts of Georgia and Florida with no size restrictions elsewhere, and PLL fishing for dolphin and wahoo is prohibited in areas closed to the use of such gear for HMS. Dolphin/wahoo longline vessels must also comply with sea turtle protection measures. Finally, there is also a non-binding 1.5 million pound (or 13 percent of the total harvest) cap on commercial landings for dolphin. Should the catch exceed this level, the SAFMC would review the data and evaluate the need for additional regulations, which may be established through a framework action.

The recreational dolphin fishery has the same minimum size restrictions as the commercial fishery. In addition, there is a recreational bag limit of 2 wahoo per person per day and 10 dolphin per person per day or 60 dolphin per vessel per day, whichever is less (headboats are excluded from the vessel limit). There is a prohibition on recreational sale of dolphin and wahoo caught under the bag limit unless the seller holds the necessary commercial permits.

The authorized gears for dolphin and wahoo fishery are hook-and-line gear including manual, electric, and hydraulic rods and reels; bandit gear; handlines; longlines; and spearfishing (including powerheads) gear. PLL vessels permitted in the shark and swordfish fisheries are subject to the hook size regulations regarding the HMS fishery, which has impacted their ability to simultaneously fish for dolphin by attaching smaller-hooked gangions directly to their PLL gear. The total 1999 recreational harvest accounted for 91 percent (10,127,970 pounds total recreational harvest and 1,050,090 pounds commercial harvest) of the total U.S. harvest (NMFS, 2003).

The commercial fishery for wahoo appears to be incidental to fishing for dolphin or other pelagic species. Like dolphin, the recreational landings of wahoo account for a larger proportion of the total harvest in the Gulf of Mexico and Atlantic Ocean. In 1999, the total commercial harvest amounted to 99,159 pounds, compared to 1.41 million pounds harvested by recreational anglers (NMFS, 2003).

The dolphin/wahoo fishery is extremely seasonal in nature. This seasonality would influence the number of displaced shark fishermen's ability to direct effort towards dolphin and wahoo. In addition, there have been no formal stock assessments for dolphin or wahoo. The status of wahoo is considered unknown, and time-series data seems to indicate neither a decline in stock abundance nor a decrease in mean size of individual dolphin fish (SAFMC, 1998). However, a precautionary approach to management was taken in 2003 since the dolphin and wahoo tend to aggregate, they are economically valuable before the age of maturity, and there is high interannual variability in these stocks due to environmental factors. Therefore, the 2003 FMP set harvest limits based on the status quo at that time.

As of November 5, 2009, 309 dolphin/wahoo permit holders also have directed or incidental shark permits (Table 3.26). One hundred seventy nine of these dolphin/wahoo permit holders are from the state of Florida (Table 3.26). Because the dolphin/wahoo fishery is an open access fishery, shark permit holders who do not currently have a dolphin/wahoo permit would be able to enter the fishery in the south Atlantic. Fishermen in the Gulf of Mexico could switch to the dolphin/wahoo fishery without trip limits or any permit requirements. However, gear modification may be difficult since dolphin and wahoo are pelagic in nature, and PLL gear requires the use of 18/0 (with an offset not to exceed 10°) or 16/0 non-offset circle hooks. These larger hooks would make it difficult to catch small dolphin and wahoo, thus limiting catch to larger individuals. In addition, because of the seasonal nature of this fishery, directed fishing year-round would be difficult.

### Spanish mackerel

In the south Atlantic, fisheries for Spanish mackerel (*Scomberomorus maculatus*) are important for commercial participants who also engage in shark fisheries. Fisheries are managed by the SAFMC and the GMFMC under the FMP for Coastal Migratory Pelagic Resources and its amendments. A stock assessment for south Atlantic Spanish mackerel was completed in 2008 and concluded that the population is not overfished or experiencing overfishing (SEDAR, 2008).

Authorized gear for Spanish mackerel in the south Atlantic include automatic reel, bandit gear, rod and reel, cast net, run-around gill nets, and stab nets; in the Gulf of Mexico, all gears are legal except drift and long gillnets and purse seines. However, there is an incidental catch allowance for vessels with purse seines onboard. A minimum size of 3.5 inches (8.9 cm) stretched mesh is required for all run-around gill nets and soak time is limited to one hour. The fishing year in the south Atlantic is from March 1 through the end of February. The fishing year in the Gulf of Mexico is April 1 through March 31. A federal vessel permit is required for commercial fisheries; however, the fishery is open to new participants who can demonstrate they meet an income requirement.

In the south Atlantic, the fishery is managed in two zones with differing regulations: a northern zone (Georgia to New York) and a southern zone (east coast of Florida to Dade-Monroe County). Catch restrictions vary by month and are dependant on the percentage of each zones allocation that is actually harvested. The majority of landings occur off Florida, where the commercial trip limit from April – November is 3,500 lb/trip. Trip limits are unlimited on weekdays beginning December 1 with a 1,500 lb trip limit on weekends until 75 percent of the quota is reached, and 1,500 lb daily trip limits are established. When 100 percent of the adjusted quota is met, trip limits are reduced to 500 pounds through the end of fishing year (SAFMC 2009a).

Gillnets were the predominant gear type for Spanish mackerel prior to the net ban in Florida (NMFS, 2004). As of 2003, approximately 60 percent of the overall catch came from cast nets and approximately 25 percent are caught with gillnets, the remainder being caught with other authorized gears (NMFS, 2004). In Florida, the majority of the effort is still in state waters, where gillnets are not allowed (NMFS, 2004). Some netting occurs in federal waters; however, the cast net is used more often (NMFS, 2004). Fishing effort follows the fish migrating north to waters off North Carolina in the summer and then following the fish back to

Florida during the winter months (NMFS, 2004). Sinknets are the primary gear type off North Carolina (NMFS, 2004).

Shark fishermen could transfer fishing effort to Spanish mackerel fisheries to replace some of the lost revenues as a result of measures in this proposed amendment, such as the prohibition of the retention of sharks with gillnet gear from South Carolina south. Many vessels that deploy gillnets for sharks also possess Spanish mackerel permits. Of vessels that possess directed and incidental shark permits, 222 also possess Spanish mackerel permits (Table 3.26). Because the commercial fishery for Spanish mackerel is not limited access, with only an income qualifier restriction and the stocks are healthy, this could be an attractive fishery for participants to engage in, especially those who possess vessels that are already set up for fishing with gillnet or castnet gear.

NMFS published a final rule (June 25, 2007, 72 FR 34632) revising regulations implementing the ALWTRP by expanding the Southeast U.S. Restricted Area and modifying regulations pertaining to gillnetting within the Southeast U.S. Restricted Area. NMFS prohibits gillnet fishing or gillnet possession during annual restricted periods associated with the right whale calving season. Limited exemptions to the fishing prohibitions are provided for gillnet fishing for sharks and for Spanish mackerel south of 29°00' N. Latitude. An exemption to the possession prohibition is provided for transiting through the area if gear is stowed in accordance with this final rule. This action is required to meet the goals of the MMPA and the ESA. This action is necessary to protect northern right whales from serious injury or mortality from entanglement in gillnet gear in their calving area in Atlantic Ocean waters off the Southeast U.S.

### King Mackerel

Commercial fisheries for king mackerel (*Scomberomorus cavalla*) are an important source of revenue for participants in the Atlantic and Gulf of Mexico regions. Similar to Spanish mackerel, king mackerel is managed by both the SAFMC and GMFMC under the Coastal Migratory Pelagic Resources FMP.

A stock assessment was conducted for king mackerel in 2009. The assessment determined that the Atlantic and Gulf of Mexico migratory groups of king mackerel are not overfished and that it was uncertain if the two stocks are experiencing overfishing (SEDAR, 2009). Permits in the commercial fishery are limited access and there is currently a permit moratorium in place. The minimum size for king mackerel is 24 inches (61 cm); however, vessels may possess up to five percent of the fish on board as undersized fish. In the south Atlantic, the fishing season is March 1 through the end of February, or until the quota of 3.71 million pounds is met. In the Gulf of Mexico, the fishing year is July 1 through June 30, or until the quota of 1.01 million pounds is met.

In the south Atlantic, trip limits vary by region and time of year, including:

- From New York to Flagler/Volusia County, Florida from April 1 to March 31, the trip limit is 3,500 pounds;
- From Flagler/Volusia to Volusia/Brevard County lines from April to October 31, the trip limit is 75 fish; and,

- In Monroe County, Florida, from April 1 to October 31, the trip limit is 1,250 pounds.

Authorized gear for king mackerel varies by region, including: rod and reel, bandit gear, handline, automatic reel, gillnets, and long gillnets (except north of Cape Lookout, North Carolina); PLL, run-around gillnets (>4.75 inches (12.1 cm) stretched mesh); and purse seine (no more than 400,000 lb may be harvested by purse seine) (SAFMC, 2009b).

In the Gulf of Mexico, trip limits are established according to regional sub-divisions, each with their own quota.

- From the Florida/Alabama state boundary through Texas, the trip limit is 3,000 pounds.
- From The Florida/Alabama state boundary to the Lee/Collier County, Florida, boundary, the trip limit is 1,250 pounds.
- From the Lee/Collier County boundary to the Monroe/Miami-Dade County boundaries, from November 1 through March 31, the trip limit is 1,250 pounds.
- From the Monroe/Miami-Dade County boundary to the Broward/Volusia County boundary, from November 1 through March 31, the trip limit is 50 fish until February 1, when it increases to 75 fish if 75 percent of the quota is not taken.

There are 188 king mackerel permits held by shark permit holders (directed and incidental combined) as of November 5, 2009 (Table 3.26). The king mackerel fishery is limited access so entry by those who do not currently possess a permit would be more difficult. Because approximately one-third of shark permit holders also have king mackerel permits, NMFS anticipates that shark fishermen may increase fishing effort in king mackerel fisheries. Vessels that are already set up to deploy run-around gillnets, PLL, bandit gear, or other gillnets are most likely to increase fishing effort in the king mackerel fishery as they would have the least difficulty reconfiguring their vessel.

#### South Atlantic Snapper-Grouper Fishery

The SAFMC manages the 73 species that comprise the south Atlantic snapper-grouper fishery management unit (FMU). In 1998, Amendment 8 to the snapper-grouper FMP was implemented initiating a limited access program. Recent stock assessments were conducted for two deepwater snapper-grouper species, snowy grouper and golden tilefish as well as some shallower snapper-grouper species (red porgy, vermilion snapper, and black sea bass). Snowy grouper, black seabass, and red porgy were found to be overfished. Red porgy and golden tilefish were determined to not be overfished, and the overfished status of vermilion snapper was unknown. Snowy grouper, golden tilefish, black seabass, and vermilion snapper were determined to be experiencing overfishing. An assessment of south Atlantic red snapper conducted in 2008 determined that the stock is overfished and experiencing overfishing. Stock assessments for south Atlantic and Gulf of Mexico black grouper, and south Atlantic red grouper are scheduled to be completed in January 2010.

NMFS implemented the final rule for Amendment 13C to the FMP for the south Atlantic snapper-grouper Fishery on October 23, 2006 (71 FR 55096). The intent of the amendment was

to reduce harvests, end overfishing, and achieve optimum yield. The management measures included in the final rule included reductions in annual commercial quotas for snowy grouper and golden tilefish. Quotas were specified for black sea bass, red pogy, and vermilion snapper, and commercial trip limits were increased for red pogy. Amendment 14 was approved in January 2009 (74 FR 1621) and established eight MPAs off south Atlantic states to protect a portion of the population and habitat of deepwater snapper-grouper species from directed fishing pressure. Amendment 2 to the 2006 Consolidated HMS FMP prohibited use of shark BLL gear in the MPAs, and prohibits harvest for all species in the snapper-grouper complex in these eight MPAs.

In March 2008, Amendment 15A (73 FR 14942) updated management reference points for snowy grouper, black sea bass, and red pogy, modified rebuilding schedules for snowy grouper and black sea bass; defined rebuilding strategies for snowy grouper, black sea bass, and red pogy, and redefined the minimum stock size threshold for the snowy grouper stock. Amendment 16 published in June 2009 (74 FR 30964) and became effective at on July 29, 2009. Measures included seasonal restrictions on shallow water groupers, a recreational closure for vermilion snapper, new quotas for gag grouper and vermilion snapper, and recreational bag limits. Amendment 15B published in November 2009 (74 FR 58902) and contained a number of actions that may affect the fishery, including adjusting snowy grouper allocations and quotas, requiring sea turtle release gear, and implementation of bycatch monitoring protocols.

In response to the 2006 Magnuson-Stevens Reauthorization Act and the 2008 red snapper stock assessment, the SAFMC is developing Amendment 17 to address overfishing requirements by 2010. This includes increasing catch limits and establishing new closed areas for snapper-grouper fishing. The amendment would also establish ACLs and AMs for 10 species (red snapper, golden tilefish, snowy grouper, speckled hind, warsaw grouper, black grouper, black sea bass, gag, red grouper, and vermilion snapper) within the snapper-grouper fishery. The Amendment has been split into two, with Amendment 17A addressing the overfishing of red snapper (NMFS, 2009b), and Amendment 17B addressing ACLs and AMs for black grouper, black sea bass, gag, golden tilefish, red grouper, snowy grouper, vermilion snapper, speckled hind, and warsaw grouper (NMFS, 2009c). The Draft Environmental Impact Statement for Amendment 17A is expected to be available for public comment in March 2010 (SAFMC, 2010). At the December 2009 meeting, the SAFMC approved Amendment 17B for submission to the Secretary of Commerce for approval (SAFMC, 2010). This includes a proposal for an annual recreational and commercial closure of waters 240 feet seaward to deepwater species harvest, mainly to reduce fishing effort on warsaw grouper and speckled hind. Amendment 17B is expected to be implemented in fall of 2010 (NMFS, 2009c). A limited access privilege program for golden tilefish, among other management measures, is being considered to be included in Amendment 18.

In December 2006, the SAFMC voted to explore the use of a LAPP for the snapper-grouper fishery, which could include the use of IFQ. Shark directed and incidental permit holders that already possess limited access permits in the snapper-grouper fishery may benefit from a future IFQ program as it may mitigate the more restrictive management measures that are in place for some of the snapper-grouper species. However, entrance into the snapper-grouper

fishery is difficult due to the need to find two transferable limited access permits available for purchase.

As of November, 2009, 108 shark directed and incidental permit holders also held permits in the south Atlantic snapper-grouper fishery (Table 3.26). New entrants into the snapper-grouper fishery must obtain two existing snapper-grouper transferable permits and exchange them for one new permit. Allowable commercial gear for the snapper-grouper fishery includes vertical hook and line including bandit gear, black seabass pots, sink nets (North Carolina only), and BLL. Vessels with BLL gear onboard may only possess snowy grouper, one warsaw grouper, yellowedge grouper, misty grouper, golden tilefish, blueline tilefish, and sand tilefish. No other snapper-grouper species may be possessed or harvested.

#### **4.10 Cumulative Ecological Impacts**

##### Fishing Impacts

The SCS commercial quota preferred alternative, Alternative A6, which would establish a separate blacknose shark quota and would set the non-blacknose SCS quota equal to average landings, would provide minor beneficial cumulative ecological impacts by stopping overfishing of blacknose sharks and rebuilding the stock. By allowing a limited blacknose shark quota, the Agency would ensure that data for stock assessments and life history samples would continue to be collected, which would help with future stock assessments and management of these stocks. The commercial gear restriction preferred alternative, the No Action alternative, is expected to have neutral cumulative ecological impacts because this alternative maintains all the currently authorized gears in the Atlantic shark fishery. NMFS anticipates that some of the displaced SCS fishing effort may be redistributed to other gillnet and BLL fisheries due to the quota reductions and any closures that occur from quotas being filled. As shown in Chapter 3 (Table 3.26), many shark fishermen hold permits in other BLL and gillnet fisheries. Redistributed effort to these other fisheries could result in indirect adverse ecological impacts in those fisheries. However, because most of those fisheries are limited access and have quotas and/or restricted fishing seasons in place to limit catch and prevent overfishing, NMFS feels any adverse ecological impacts due to redistributed effort would likely be minor. A significant portion of blacknose shark mortality also occurs in the shrimp trawl fisheries in the South Atlantic and Gulf of Mexico. NMFS will continue to work closely with the Regional Fishery Management Councils in these regions to reduce bycatch of this species, as appropriate, in order to meet the bycatch reduction targets needed in the shrimp fishery in order to rebuild this stock.

Other fisheries that are open access that shark fishermen could pursue, such as the mackerel fishery and the dolphin/wahoo fishery, generally have few interactions with protected resources and little bycatch compared to directed shark fishing trips (see NMFS, 2003 and Carlson and Bethea, 2007). Therefore, redistributed effort into these fisheries is not anticipated to increase interactions with protected resources or result in significant increases in bycatch. In addition, retention limits, quotas and other effort controls are in place for these fisheries to protect the stocks from overfishing and from being overfished.

In addition to these impacts, cumulative ecological impacts on HMS stocks and fisheries due to actions under consideration by Regional Fishery Management Councils, Interstate Marine

Fisheries Commissions, or other management bodies may be slightly beneficial. NMFS backstopped the Caribbean Fishery Management Council's area closures which could have minor positive benefits for Atlantic HMS (72 FR 5633, February 7, 2007). NMFS also published a rule that requires sea turtle handling and release equipment in the shark BLL fishery (72 FR 5633, February 7, 2007). Additionally, NMFS backstopped the eight marine protected areas implemented by the South Atlantic Fishery Management Council in Amendment 2 to the 2006 Consolidated HMS FMP (June 24, 2008, 73 FR 35778; July 15, 2008, 73 FR 40658). The Gulf of Mexico Fishery Management Council implemented regulations that would implement similar dehooking requirements to those required in the HMS PLL fishery and to those for the HMS BLL fishery (71 FR 45428, August 9, 2006). New requirements for non-stainless steel circle hooks in the reef fish fishery under Amendment 27 were implemented on January 29, 2008 (73 FR 5117) by the Gulf of Mexico Fishery Management Council. NMFS has also recently implemented workshops for the safe handling and release and identification of protected resources for all HMS gillnet and longline fishery participants, and identification workshops for shark dealers (71 FR 58058, October 2, 2006). NMFS implemented an emergency rule that closed the Gulf of Mexico BLL reef fish fishery shoreward of 50 fathoms east of Cape San Blas, FL from May 18, 2009 to October 28, 2009, to reduce sea turtle bycatch in the Gulf of Mexico BLL reef fish fishery. On December 31, 2009, NMFS published a Notice of Availability for Amendment 31 that includes measures in the Gulf of Mexico BLL reef fish fishery to protect sea turtles (74 FR 69322). NMFS would closely monitor any resulting redistribution of effort from the reef fish fishery to the shark BLL fishery in the Gulf of Mexico.

The incremental contribution of the actions in Amendment 3 to the 2006 Consolidated HMS FMP, when considered in conjunction with the activities listed above, is considered a minimal cumulative ecological benefit to the ecology of the managed shark species. The measures listed above were implemented to help reduce interactions with protected species, or increase post-release survival of non-target species and protected species, to help rebuild overfished fish stocks and end overfishing, or to protect EFH for deep water species. In conjunction with Amendment 3 to the 2006 Consolidated HMS FMP, which would help rebuild blacknose shark stocks and end overfishing, such measures would help conserve fishery resources in the long-term, which would ultimately have positive ecological impacts.

The preferred alternatives regarding smooth dogfish (alternative F2 and sub-alternatives F2a4 and F2b1) would likely have minor beneficial cumulative ecological impacts as the preferred alternative would establish a federal permit, a commercial quota, observer coverage to better characterize protected resources interactions, but would not significantly alter current fishing practices. The preferred commercial and recreational alternatives for shortfin mako sharks (alternatives C5, C6, E3 and E4) would likely have minimal beneficial cumulative ecological impacts. The shortfin mako shark preferred alternatives would encourage the live release of the species in both the commercial and recreational sectors, which would only affect post-catch behavior and not fishing practices, and would establish a foundation to work at the international level to implement an international plan to end overfishing of this species.

### Non-Fishing Impacts

Potential sources of non-fishing impacts are numerous and varied. A few can negatively impact EFH, however, even in cases where such impacts can be demonstrated, it is often difficult

to quantify. Broad categories of activities that may adversely affect HMS EFH include, but are not limited to: (1) actions that physically alter structural components or substrate, *e.g.*, dredging, filling, excavations, water diversions, impoundments and other hydrologic modifications; (2) actions that result in changes in habitat quality, *e.g.*, point source discharges; (3) activities that contribute to non-point source pollution and increased sedimentation; (4) introduction of potentially hazardous materials; or (5) activities that diminish or disrupt the functions of EFH. If these actions are persistent or intense enough, they can result in major changes in habitat quantity as well as quality, conversion of habitats, or in complete abandonment of habitats by some species. Non-fishing activities that may affect EFH are described in Section 10.5 of the 2006 Consolidated HMS FMP (NMFS, 2006) and Amendment 1 to the 2006 Consolidated HMS FMP (NMFS, 2009a).

#### **4.11 Cumulative Social and Economic Impacts**

The commercial SCS preferred alternatives, which would establish a separate blacknose shark quota and would set the non-blacknose SCS quota equal to average landings, would likely result in minimal adverse cumulative socioeconomic impacts on Atlantic shark fishermen. The no action alternatives, B1 and D1, which would maintain current authorized gears in the Atlantic shark fishery and maintain the current recreational size and retention limit for SCS, respectively, would have neutral cumulative socioeconomic impacts to fishery participants. It is unlikely that shark fishermen would be able to recuperate any potential economic losses by switching to other southeast fisheries due to quota reductions and/or limited access programs in these other fisheries. The Agency presumes that since some shark fishermen also possess several permits in other fisheries (Table 3.26 in Chapter 3), they do not receive all of their revenues from shark products. At the present time, NMFS estimates that fishermen make decisions about which fisheries to participate in based on the ex-vessel prices they can expect from a given species of fish, seasonality, quotas, trip limits, and other factors. In the past, due to higher quotas, revenues received from sharks likely comprised a larger share of fishermen's overall revenues from fishing activities than is expected in the future. However, it could be difficult for lost shark revenues to be replaced by transferring more effort to other fisheries in which they have historically participated due to restrictions in those fisheries as well.

There are limited-access permit programs in place for the South Atlantic snapper-grouper fishery as well as the Gulf of Mexico reef fish fishery, where no new permits are being issued. Therefore, if shark fishermen do not currently possess a South Atlantic snapper-grouper permit or a Gulf of Mexico reef fish permit, it would be difficult and costly to enter these fisheries in the future. There are also quota reductions for many reef fish species (see above), which would affect current Gulf of Mexico reef fish permit holders. Thus, shark fishermen who have shark and reef fish permits could experience economic hardships in both fisheries.

In addition, there is an IFQ program in place for the Gulf of Mexico red snapper fishery, with limitations on transfers during the first five years (see above), and a new IFQ program would be implemented in the near future for the South Atlantic snapper-grouper fishery. These IFQ programs could benefit current South Atlantic snapper-grouper or Gulf of Mexico red snapper permit holders; however, it would make it difficult and expensive for shark fishermen who do not currently possess these permits to enter these fisheries in the future.

As mentioned in Section 4.9, the dolphin/wahoo fishery is an open access fishery. However, redistribution of commercial shark fishing effort into this fishery may result in user conflicts between recreational and commercial fishermen. Additionally, commercial PLL fishermen that currently fish for dolphin and wahoo could suffer economically if a large proportion of the shark fishermen redirect their effort to the dolphin/wahoo fishery, given the 1.5 million pounds commercial landings cap (or 13 percent of total landings, whichever is greater) for the dolphin fishery. If this cap is exceeded, the SAFMC may decide to take more stringent measures in this fishery to reduce overall catch. More importantly, due to the seasonality of the dolphin/wahoo fishery, it would be difficult for commercial fishermen to direct on dolphin/wahoo (S. Branstetter, NOAA, personal communication). Finally, it would be difficult for shark fishermen using PLL gear to catch smaller dolphin and wahoo due to hook requirements in the PLL fishery (see discussion above). Shark fishermen would have to either target larger fish with larger circle hooks or relinquish their HMS permit(s) so that they could use smaller hook sizes to target smaller dolphin/wahoo. The latter would preclude them from retaining any HMS catch.

It is likely that shark fishermen using gillnet gear for sharks would transfer some fishing effort to the Spanish mackerel fishery. Participants currently using other gears for sharks may consider purchasing the necessary gear (*e.g.*, gillnets, *etc.*) to become involved in this fishery. Since this fishery is not limited access, transferring effort into this fishery would not require paying high costs to acquire permits from other vessels. Furthermore, since the stock status of Spanish mackerel is healthy, there does not appear to be any significant restrictions on quotas or other effort controls necessary at this time or in the foreseeable future. However, this fishery is seasonal, so year-round revenues from Spanish mackerel may not be realized. Rather, participants in North Carolina would be expected to fish for Spanish mackerel in the summer while participants in Florida could target these fish in the winter.

The commercial fishery for king mackerel is managed via a limited access permit system, and shark fishermen who do not currently possess a king mackerel permit may have a difficult time entering this fishery. However, there are 188 participants in the shark fishery that currently possess these king mackerel permits. Therefore, effort in this fishery is expected to increase as a result of shark management measures in this amendment.

The additional management measures taken by other Regional Fishery Management Councils and Commissions, such as the eight MPAs implemented by the SAFMC's Amendment 14, dehooking requirements by the GMFMC, the interstate shark plan being implemented by the ASMFC, and the requirement to use non-stainless steel, circle hooks in the reef fish fishery as well as other rules that NMFS has recently implemented for protected species and to protect EFH, would all have moderate adverse cumulative socioeconomic impacts on fishery participants. Therefore, the incremental contribution of the measures in Amendment 3 to the 2006 Consolidated HMS FMP, when considered with these other actions, is expected to have moderate adverse cumulative socioeconomic impacts on participants in the shark fishery. However, because these measures were implemented to help reduce interactions with protected species or increase post-release survival of non-target species and protected species, to help rebuild overfished fish stocks and end overfishing or to protect EFH for deep-water species, such

measures would help conserve fishery resources in the long-term, which could ultimately have beneficial cumulative economic and social impacts for fishermen in the long-term

The smooth dogfish preferred alternatives are expected to minor adverse cumulative socioeconomic impacts due to the new regulations and increased restrictions on a currently unmanaged fishery. The smooth dogfish preferred alternative would establish a federal permit requirement and the associated fees are expected to be minimal and not present a significant impediment for fishermen wishing to enter or remain in the fishery. The preferred alternative would also establish a quota above current average landings and is not expected to have change the way the fishery currently operates. A requirement to land smooth dogfish with fins naturally attached to the carcass through offloading is included in the preferred alternative and would change the current operation of the fishery. In order to help mitigate any potential adverse socioeconomic impacts to smooth dogfish fishery participants from these new regulations, NMFS is delaying the implementation of these measures until 2012 to give the fishery participants a chance to change their practices to comply with the regulations.

The shortfin mako shark preferred alternative which would encourage the live release of the species in the commercial and recreational sectors, and would only affect post-catch behavior and not fishing practices and is likely to have neutral cumulative socioeconomic impacts on fishery participants. In addition, the preferred alternative to work at the international level with other countries to implement a plan to end overfishing of shortfin mako sharks would only have minor adverse cumulative socioeconomic impacts if and when those management measures implemented that would reduce fishing opportunities for U.S. fishermen.

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## CHAPTER 5 TABLE OF CONTENTS

<b>Chapter 5 Table of Contents</b> .....	<b>5-i</b>
<b>5.0 Mitigation and Unavoidable Impacts</b> .....	<b>5-1</b>
5.1 Mitigation Measures .....	5-1
5.2 Unavoidable Adverse Impacts .....	5-3
5.2.1 Unavoidable Adverse Socioeconomic Impacts .....	5-3
5.2.2 Unavoidable Adverse Ecological Impacts .....	5-4
5.3 Irreversible and Irretrievable Commitment of Resources.....	5-4



## **5.0 MITIGATION AND UNAVOIDABLE IMPACTS**

### **5.1 Mitigation Measures**

The alternatives were specifically selected to mitigate potential adverse impacts on the environment. As a result, mitigation was explicitly addressed in the analyses conducted for selecting the preferred alternatives in other sections of this FEIS including Chapters 4, 6, 7, 8, and 9. At this time, NMFS has not identified other mitigation measures to offset adverse impacts. NMFS would monitor the impacts of the management measures in the preferred alternatives and would consider other mitigation measures in the future as necessary. NMFS chose to develop alternatives that avoided, minimized, and mitigated adverse ecological, social and economic impacts from the outset, thus avoiding to the greatest extent practicable residual or unavoidable adverse impacts. That approach is reflected in changes to the preferred alternatives between the DEIS and FEIS based on the comments of public and private stakeholders and additional agency analysis and is explained in earlier chapters. While the FEIS identifies NMFS preferred alternatives, the Agency retains discretion to choose any reasonable alternative evaluated in this FEIS.

As stated above, mitigation measures were explicitly addressed in the analyses conducted for selecting the management measures in the preferred alternatives. For example, in analyzing possible quotas and retention limits for SCS and blacknose sharks, the preferred alternative was identified because it balances the need to end overfishing based on recent assessments, while allowing for the non-blacknose SCS and limited blacknose shark fisheries to continue. For pelagic sharks, the preferred alternatives were identified to address mortality of shortfin mako sharks, which were determined to be experiencing overfishing. NMFS would address overfishing at the international level and promote the release of shortfin mako sharks that are brought to the vessels alive. This would address the majority of shortfin mako mortality that occurs outside of the United States. To mitigate some of the potential impacts as a result of the preferred alternatives, gillnet gear would, under the preferred alternative for commercial gear, continue to be an authorized gear type for the Atlantic shark fisheries. In addition, directed and incidental permit holders would still be authorized to land non-sandbar LCS, sandbar sharks (in the shark research fishery), non-blacknose SCS, blacknose sharks and pelagic sharks, as established in this amendment and Amendment 2 to the Consolidated HMS FMP. The quotas and retention limits in the preferred alternatives comply with the mandate to end overfishing, while still providing a reasonable opportunity to target sharks and harvest the allocated quota.

The NMFS Southeast Regional Office Protected Resources Division (SERO PRD) has initially determined that management of smooth dogfish may adversely affect ESA-listed species. Based on this determination, NMFS initiated formal Section 7 consultation in accordance with the ESA, paragraph 7(a)(2), and provided SERO PRD with the information required by 50 CFR 402.14(c). SERO PRD is in the process of preparing a BiOp, which will not likely be issued prior to the Agency signing a Record of Decision for the final Amendment 3 to the 2006 Consolidated HMS FMP and implementing regulations. Use of gillnets in the shark fishery were considered in the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP, and while there are likely direct, minor adverse effects in the short-term, the gear type, location and effort

are not likely to result in jeopardy of the listed species in the long-term. Under the No Action alternative for smooth dogfish (F1), these interactions and minor adverse effects would continue to occur because the fishery is currently operating in federal waters. Moreover, the ability for NMFS to minimize the take associated with gillnets for smooth dogfish would be limited in the absence of the preferred management measures, which would require data collection, permitting, and observer coverage. These effects are being explored in more detail with SERO PRD, who will issue a BiOp addressing the effects of the smooth dogfish fishery. NMFS does not anticipate that the smooth dogfish BiOp will reveal new or significant information regarding effects on listed species beyond those considered in the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP.

Under the No Action Alternative for smooth dogfish, based on the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP, the use of shark gillnets, including those used to fish for SCS, may result in interactions with species protected under the ESA, such as the northern right whale, smalltooth sawfish, and several species of sea turtles. Since the primary gear type associated with the smooth dogfish fishery is gillnets, it is anticipated that interactions with protected species, and the resultant potential adverse effects, will continue to occur. The effects of fishing with shark gillnets was fully evaluated in the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP, which recognized that gillnet shark fishing for SCS occurs primarily from FL north to Cape Hatteras, NC, although the gear type is banned by legislation in state waters of FL, SC and GA, which may force gillnet shark fishing into federal waters where the gear type is less effective. Moreover, the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP recognized that the shark gillnet fishery in both the Southeast and mid-Atlantic are subject to the restrictions imposed by the ALWTRP, and concluded that based on the ALWTRP, adverse effects to humpback and North Atlantic right whales were extremely unlikely, and thus discountable. The ALWTRP will continue to apply to shark gillnet fisheries, including smooth dogfish, in state and federal waters, throughout the action area.

NMFS is currently engaged in formal consultation under the ESA with SERO PRD to determine the potential level of incremental effect that may arise as a result of the preferred management measures for smooth dogfish in the FEIS. SERO PRD has not yet issued a final BiOp for the smooth dogfish fishery. NMFS will review that BiOp once it is issued and supplement the analysis in this FEIS if the consultation reveals any new or significant effects with respect to the interaction between gillnet fishing for smooth dogfish and protected species that were not considered in the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP. This FEIS incorporates by reference the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP. A detailed discussion of the effects of such management relevant to the shark fishery is included in that document. NMFS does not anticipate any substantial change in impact to protected species since the measures proposed for smooth dogfish management are largely administrative, and thus unlikely to affect the manner and extent of fishing for smooth dogfish or redistribution of effort into other fisheries. NMFS assumes there is a correlation between fishing effort and protected species interactions. Since smooth dogfish management measures would establish a quota and permit requirement, fishing effort for smooth dogfish would be capped or slightly reduced with a corresponding diminishment of the possibility of increased protected resource interactions. In addition, increased observer in the smooth dogfish

fishery as a result of a federal permit requirement would better characterize protected resources interactions with the smooth dogfish fishery.

Under the preferred alternative (F2), the implementation of the management measures would be delayed until the beginning of the smooth dogfish fishing season in 2012 to allow time to consider and evaluate the information and requirements included in the final smooth dogfish BiOp. If the assessment of effects in that BiOp provides new and meaningful information not considered in this FEIS, NMFS will supplement the FEIS, as appropriate, before implementing any management measures proposed in F2. In the interim, NMFS will not impose any management authority or related conservation and management measures on the smooth dogfish fishery, and thus will not cause any effect on protected species related to such management. In other words, preferred alternative F2 would maintain the status quo with respect to the smooth dogfish fishery as it relates to protected species prior to receiving a final BiOp. While NMFS would finalize the rulemaking with measures for blacknose shark and shortfin mako sharks becoming effective 30 days after publication of the final rule in the Federal Register, the measures, if any, selected for management of smooth dogfish would be deferred to allow NMFS, in consultation with SERO PRD, to develop reasonable and prudent alternatives (RPAs) that could be implemented while avoiding adverse impacts to listed species, as necessary.

While NMFS prefers alternative F2 at this time, it retains discretion to select any reasonable alternative considered in this FEIS, including the alternative to take no action. If, after consideration of the information gathered through outreach to stakeholders, the smooth dogfish BiOp, and this FEIS, NMFS chooses to proceed with a different alternative than what was evaluated in this FEIS, re-initiation of formal consultation could be necessary if the alternative deviated from information, analyses, conclusions and authorizations in the final smooth dogfish BiOp for the preferred alternative. Moreover, NMFS would, if appropriate, amend the final rule and FMP amendment and supplement this FEIS before implementation of such management measures could occur.

In summary, while many of the actions taken in this amendment impose additional restrictions on the shark fishery, NMFS specifically developed and identified preferred alternatives that minimize economic impacts while accomplishing the mandate to end overfishing and implement a rebuilding plan for overfished shark stocks. As a result, in addition to the requirements of the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP, NMFS has not identified any additional reasonable and practicable mitigation measures which might be considered for implementation.

## **5.2 Unavoidable Adverse Impacts**

### **5.2.1 Unavoidable Adverse Socioeconomic Impacts**

Other than the No Action Alternative, there would be unavoidable adverse socioeconomic impacts resulting from implementation of any action alternative including, the preferred SCS quota alternative and corresponding SCS management measures. NMFS must administer and operate under the National Standards of the Magnuson-Stevens Act, which includes a mandate to prevent overfishing and rebuild overfished stocks. In trying to rebuild shark stocks and meet the Magnuson-Stevens Act mandate of ending overfishing, NMFS would

reduce fishing mortality and effort under the preferred SCS quota alternative. This might result in directed and incidental shark permit holders and dealers redirecting to other fisheries due to lowered quotas. However, NMFS has changed the preferred SCS quota alternative, due to public comment and additional data analysis, to allow for greater opportunities for fishermen to fish for the non-blacknose SCS while still keeping blacknose shark mortality below levels recommended by the stock assessment to rebuild this overfished stock. In addition, NMFS has changed the commercial gear restriction preferred alternative to the No Action alternative (alternative B1), which would maintain the status quo and would not prohibit gillnet gear from South Carolina south, as proposed in the DEIS. These preferred alternatives would be mitigating factors for the reduced quotas, as gillnet gear would continue to be an authorized gear and those fishermen who solely fish with this gear can continue to operate in the shark fishery. In the analyses for selecting the preferred alternatives, NMFS determined that the management measures are necessary in order to comply with the Magnuson-Stevens Act mandate to end overfishing of blacknose sharks. In addition, the preferred alternatives have been determined to be the most feasible alternatives to rebuild shark stocks according to the most recent assessments.

### **5.2.2 Unavoidable Adverse Ecological Impacts**

As described above, the preferred alternatives for blacknose and shortfin mako sharks and the corresponding management measures are expected to have positive or neutral conservation benefits for shark and bycatch species. This is because the preferred alternatives were specifically selected to mitigate any potential adverse impacts. However, this action may result in unavoidable adverse effects in the form of incidental take of listed species up to the level of authorized take in the incidental take statements of the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP. In addition, there may be incidental take of marine mammals with the continued use of gillnets under the preferred alternatives of the FEIS.

### **5.3 Irreversible and Irrecoverable Commitment of Resources**

The management measures in the FEIS would not result in any irreversible and irretrievable commitment of resources. Beneficial ecological impacts are expected due to reduction of quotas, and current retention limits and commercial gear restrictions for the Atlantic shark fishery. Because of this, the Agency expects that fishing effort and bycatch of non-target species and protected resources may decrease.

## CHAPTER 6 TABLE OF CONTENTS

<b>Chapter 6 Table of Contents</b> .....	<b>6-i</b>
<b>Chapter 6 List of Tables</b> .....	<b>6-ii</b>
<b>6.0 Economic Evaluation</b> .....	<b>6-1</b>
6.1 Number of Vessel and Dealer Permit Holders.....	6-1
6.2 Gross Revenue of the Commercial Shark Fishermen.....	6-2
6.3 Variable Costs and Net Revenues of Commercial Shark Fishermen .....	6-4
6.4 Expected Economic Impacts of the Alternatives.....	6-5
6.4.1 Commercial Measures .....	6-5
6.4.2 Recreational Measures .....	6-29
6.4.3 Smooth Dogfish .....	6-31
<b>Chapter 6 References</b> .....	<b>6-38</b>

**CHAPTER 6 LIST OF TABLES**

Table 6.1 Number of Shark Limited Access Permits holder between 2004 and 2009. .... 6-1

Table 6.2 Number of CHB Permits by Year in 2009-2006. .... 6-2

Table 6.3 Number of shark dealer permits issued from 2004-2009. The actual number of permits per region may change as permit holders move or sell their businesses. .... 6-2

Table 6.4 Estimates of the total ex-vessel annual revenues of Atlantic Shark HMS fisheries. Sources: NMFS 2008; Cortés, 2003; Cortés and Neer, 2002, 2005; Cortés, pers.comm. .... 6-3

Table 6.5 Ex-vessel prices per pound dress weight for shark complexes from 2004-2007..... 6-4

Table 6.6 Ex-vessel prices per pound dress weight for proposed shark species quotas from 2004-2007. .... 6-4

Table 6.7 Median real ex-vessel prices for shark species groups from 2004-2007. Prices adjusted to December 2007 dollars using CPI-U..... 6-4

Table 6.8 Average ex-vessel prices and average annual gross revenues from 2004-2007 under the No Action alternative, A1. Shark fins are assumed to be 5 percent of the carcass weight. .... 6-6

Table 6.9 Average ex-vessel prices and average annual gross revenues from 2004-2007 under alternative A2. Shark fins are assumed to be 5 percent of the carcass weight..... 6-8

Table 6.10 Average ex-vessel prices and average annual gross revenues from 2004-2007 under alternative A3. Shark fins are assumed to be 5 percent of the carcass weight..... 6-10

Table 6.11 Average ex-vessel prices and average annual gross revenues for entire fishery from 2004-2007 under alternative A4. Shark fins are assumed to be 5 percent of the carcass weight. .... 6-13

Table 6.12 Lost average annual gross revenues (from 2004-2007) for vessels that fish for non-blacknose SCS and blacknose sharks with gillnet gear under alternative A4. Shark fins are assumed to be 5 percent of the carcass weight. .... 6-16

Table 6.13 Lost average annual gross revenues (from 2004-2007) for vessels that fish for LCS with gillnet gear under alternative A4. Shark fins are assumed to be 5 percent of the carcass weight. .... 6-18

Table 6.14 Average annual gross revenues (from 2004-2007) of vessels that land LCS but do not use gillnet gear under alternative A4. Shark fins are assumed to be 5 percent of the carcass weight. .... 6-19

Table 6.15 Lost average annual gross revenues (from 2004-2007) for vessels landings non-blacknose SCS, blacknose sharks, and LCS under alternative A5. Shark fins are assumed to be 5 percent of the carcass weight. .... 6-21

Table 6.16 Average ex-vessel prices and average annual gross revenues from 2004-2007 under alternative A6. Shark fins are assumed to be 5 percent of the carcass weight..... 6-23

Table 6.17 Estimates of shortfin mako shark landings (lb dw) reductions according to size restrictions in alternatives C4a and C4b. .... 6-29

Table 6.18 Total number of shortfin mako sharks reported to the LPS from 2004 to 2008.....  
.....6-31



## 6.0 ECONOMIC EVALUATION

This section assesses the economic impacts of the alternatives presented in this document. The primary purpose of this chapter is to provide the baseline economic data for the Regulatory Impact Review (RIR) in Chapter 7 and the Final Regulatory Flexibility Analysis (FRFA) in Chapter 8. It also provides relevant data for Community Profiles described in Chapter 9. While this chapter provides an economic analysis, more specific data necessary to completely analyze socio-economic impacts related to the preferred management measures and amendments is disclosed in Chapters 3, 4 and 9.

### 6.1 Number of Vessel and Dealer Permit Holders

In order to examine the baseline universe of entities potentially affected by the preferred alternatives, NMFS analyzed the number of permits that were issued as of March 2009 in conjunction with HMS fishing activities.

As of October 2009, there were a total of 508 commercial permit holders in the Atlantic shark fishery (223 directed and 285 incidental permits). Table 6.1 provides a summary of these permit holders since 2004. Further detail regarding commercial permit holders is provided in Chapter 3.

**Table 6.1 Number of Shark Limited Access Permits holder between 2004 and 2009.**

Year	# Directed Shark	# Incidental Shark
2009	223	285
2008	214	285
2007	231	296
2006	240	312
2005	235	320
2004	241	348

In addition to the universe of commercial shark permit holders, some of the alternatives considered also impact Atlantic HMS CHB and HMS Angling permit holders. The historic numbers of CHB and Angling permit holders are listed in Table 6.2. The total number of CHB increased between 2006 and 2009.

**Table 6.2** Number of CHB Permits by Year in 2009-2006.

Year	CHB Permits	Angling Permits
2009	4,837	25,506
2008	4,297	32,934
2007	3,899	24,220
2006	4,173	25,238

As of October, 2009, there were a total of 106 Atlantic shark dealer permit holders. Table 6.3 provides a summary of shark dealer permit holders by year. Further detail regarding shark dealer permit holders is provided in the 2006 Consolidated HMS FMP. All dealer permit holders are required to submit reports detailing the nature of their business. For shark permit holders, dealers must submit bi-weekly dealer reports on all HMS they purchase. To facilitate quota monitoring “negative reports” for shark are also required from dealers when no purchases are made (*i.e.*, NMFS can determine who has not purchased fish versus who has neglected to report).

**Table 6.3** Number of shark dealer permits issued from 2004-2009. The actual number of permits per region may change as permit holders move or sell their businesses.

Year	Atlantic shark dealers
2009	106
2008	128
2007	206
2006	336
2005	228
2004	230

## 6.2 Gross Revenue of the Commercial Shark Fishermen

NMFS calculated annual gross revenues by combining current federal permit holders with their reported landings from logbooks and shark dealer reports averaged from 2000 to 2008. These landings were multiplied by ex-vessel prices for LCS meat, pelagic shark meat, SCS meat, and shark fins obtained from dealer reporting to determine annual gross revenues.

Of all Atlantic HMS, sharks bring in the lowest total gross revenues (~\$3 million in 2008) according to the 2009 SAFE Report. Table 6.4 provides data on the prices shark fishermen received at the dock. The average values for ex-vessel prices from the Southeast Fisheries Science Center’s Accumulative Landings System (ALS) and dealer reports from the Northeast were used to construct the table.

**Table 6.4** Estimates of the total ex-vessel annual revenues of Atlantic Shark HMS fisheries. Sources: NMFS 2008; Cortés, 2003; Cortés and Neer, 2002, 2005; Cortés, pers.comm.

Species		2000	2001	2002	2003	2004	2005	2006	2007	2008
Large coastal sharks	Ex-vessel \$/lb dw	\$0.68	\$0.91	\$0.99	\$0.78	\$0.86	\$0.86	\$0.89	\$0.58	\$0.61
	Weight lb dw	3,713,125	3,414,967	4,151,594	4,292,403	3,213,896	3,147,196	3,808,662	2,329,272	1,362,904
	Fishery Revenue	\$2,524,925	\$3,107,620	\$4,110,078	\$3,348,074	\$2,763,951	\$2,706,589	\$3,389,709	\$1,350,978	\$831,371
Pelagic sharks	Ex-vessel \$/lb dw	\$1.09	\$1.11	\$0.99	\$1.04	\$1.12	\$1.16	\$1.14	\$1.10	\$1.07
	Weight lb dw	350,705	345,895	467,682	637,324	679,469	252,815	192,843	262,179	234,546
	Fishery Revenue	\$382,268	\$383,943	\$463,005	\$662,817	\$761,005	\$293,265	\$219,841	\$288,397	\$250,964
Small coastal sharks	Ex-vessel \$/lb dw	\$0.46	\$0.79	\$0.52	\$0.43	\$0.50	\$0.52	\$0.51	\$0.63	\$0.55
	Weight lb dw	593,027	724,332	615,915	534,523	451,651	634,885	763,327	618,191	623,848
	Fishery Revenue	\$272,792	\$572,222	\$320,276	\$229,845	\$225,826	\$330,140	\$389,297	\$389,460	\$343,116
Shark fins (weight = 5% of all sharks landed)	Ex-vessel \$/lb dw	\$10.47	\$19.67	\$19.87	\$17.09	\$16.25	\$18.18	\$18.53	\$13.84	\$13.76
	Weight lb dw	232,843	224,260	261,760	273,213	217,251	201,745	238,242	160,482	111,065
	Fishery Revenue	\$2,437,865	\$4,411,188	\$5,201,162	\$4,669,202	\$3,530,326	\$3,667,720	\$4,414,617	\$2,221,072	\$1,528,253
Total sharks	Fishery Revenue	<b>\$5,617,851</b>	<b>\$8,474,974</b>	<b>\$10,094,521</b>	<b>\$8,909,938</b>	<b>\$7,281,107</b>	<b>\$6,997,715</b>	<b>\$8,413,464</b>	<b>\$4,249,907</b>	<b>\$2,953,705</b>

Note: Average ex-vessel prices may have some weighting errors.

Table 6.5 reports ex-vessel prices by shark complex and year. The ex-vessel price data indicates somewhat stable ex-vessel prices since 2004.

**Table 6.5 Ex-vessel prices per pound dress weight for shark complexes from 2004-2007.**  
Source: HMS Dealer Reports

Species Complex	2004	2005	2006	2007
Small coastal sharks	\$0.59	\$0.60	\$0.55	\$0.75
Large coastal sharks	\$0.40	\$0.50	\$0.40	\$0.40
Pelagic sharks	\$1.01	\$1.27	\$1.35	\$1.20
Shark fins	\$10.00	\$12.00	\$12.85	\$6.00

**Table 6.6 Ex-vessel prices per pound dress weight for proposed shark species quotas from 2004-2007.**

Species	2004	2005	2006	2007
Blacknose shark	\$0.70	\$0.60	\$0.50	\$0.75
Other SCS	\$0.53	\$0.60	\$0.60	\$0.75
Shortfin mako	\$1.50	\$1.50	\$1.54	\$1.50
Other pelagic shark	\$0.52	\$0.50	\$0.55	\$0.70
Sandbar shark	\$0.40	\$0.50	\$0.45	\$0.45
Other LCS	\$0.35	\$0.48	\$0.40	\$0.40
Smooth dogfish	\$0.25	\$0.33	\$0.29	\$0.27
Smooth dogfish fins	\$1.82	\$2.25	\$1.74	\$2.00

**Table 6.7 Median real ex-vessel prices for shark species groups from 2004-2007. Prices adjusted to December 2007 dollars using CPI-U.**

Species Group	Median Real Price
Blacknose shark	\$0.66
Other small coastal sharks	\$0.67
Small coastal sharks	\$0.66
Shortfin mako	\$1.59
Other pelagic sharks	\$0.61
Pelagic sharks	\$1.27
Sandbar shark	\$0.61
Other large coastal sharks	\$0.44
Large coastal sharks	\$0.45
Shark fins	\$12.00
Smooth dogfish	\$0.29
Smooth dogfish fins	\$2.02

### 6.3 Variable Costs and Net Revenues of Commercial Shark Fishermen

In 2003, NMFS initiated mandatory cost-earnings reporting for selected vessels to improve the economic data available for all HMS fisheries. In the past, most of the studies regarding PLL variable costs and net revenues available to NMFS analyzed data from 1996 and 1997. The 2006 Consolidated HMS FMP provides a summary of several past studies on the variable costs and net revenues of longline fleets.

An analysis of the 2004 HMS logbook cost-earnings data provides updated information regarding the costs and revenue of a cross section of vessels operating in the

HMS fisheries. The data contains a total of 579 trips taken by 51 different vessels. As described in Larkin *et al.* (2000), median values are reported. Median gross revenues per trip for 2004 were approximately \$12,112. Median total costs per trip were \$4,345 (compared to \$3,320 in the Larkin *et al.* (2000) study), with fuel costs making up \$567 (13 percent) of those costs. Median net revenue in this sample was \$6,728 per trip (compared to \$8,624 in the Larkin *et al.* (2000) study). The typical trip was nine days long and involved six sets. The median number of crew was three, and the average share paid to crew was 11 percent of net revenue (\$740 per trip). The captain share of net revenue was 20 percent (\$1,346) and the owner share was reported to be 50 percent (\$3,364). The 2004 cost earnings information is similar to the findings of the 1996 study, but gross revenues appear to be lower than the Porter *et al.* (2001) study of 1997 operations.

## **6.4 Expected Economic Impacts of the Alternatives**

In this rulemaking, NMFS considered six different categories of issues to address shark management measures where each issue had its own range of alternatives that would meet the objectives of the Magnuson-Stevens Act and the 2006 Consolidated HMS FMP. The expected economic impacts of the different alternatives considered and analyzed are discussed below.

### **6.4.1 Commercial Measures**

#### **6.4.1.1 SCS Commercial Quotas**

As of October 2009, there were 223 directed shark permit holders, 285 incidental permit holders, and 106 shark dealers. On average between 2004 and 2007, approximately 85 vessels with directed shark permits had SCS landings, of which 44 vessels had blacknose shark landings. Sixty-eight of the 85 vessels with directed shark permits also had finetooth, Atlantic sharpnose, and bonnethead shark landings. On average between 2004 and 2007, approximately 31 vessels with incidental shark permits had SCS landings, of which approximately 7 vessels had blacknose landings. Twenty-nine of the 31 vessels with incidental shark permits also had finetooth, Atlantic sharpnose, and bonnethead shark landings. The average annual gross revenues from 2004 through 2007 from all SCS meat were \$435,243 (Table 6.8). Average annual gross revenues for SCS fins were \$395,675, making total average annual gross revenues for SCS landings for the entire fishery \$830,918 (Table 6.8). Directed permit holders landed approximately 97 percent of the SCS landings whereas incidental permit holders landed approximately 3 percent of the SCS total landings. Thus, directed permit holders earned approximately \$805,990 in average annual gross revenues from SCS landings whereas incidental permit holders earned approximately \$24,928 from SCS landings (Table 6.8).

As for non-blacknose SCS, or finetooth, Atlantic sharpnose, and bonnethead sharks, the average annual gross revenues from 2004 through 2007 from non-blacknose SCS meat for the entire fishery was \$350,319. Average annual gross revenues for non-blacknose SCS fins were \$313,718, making total average annual gross revenues for non-blacknose SCS landings for the entire fishery \$664,037 (Table 6.8). Directed permit

holders landed approximately 97 percent of the non-blacknose SCS landings whereas incidental permit holders landed approximately 3 percent of the non-blacknose SCS total landings. Thus, directed permit holders earned approximately \$644,116 in average annual gross revenues from non-blacknose SCS landings whereas incidental permit holders earned approximately \$19,921 from non-blacknose SCS landings (Table 6.8). Spread amongst the directed and incidental permit holders that landed non-blacknose SCS, the average directed permit holder earned \$9,765 in average annual gross revenues ( $\$664,037 / 68$  directed vessels = \$9,765 per vessel), and the average incidental permit holder earned \$687 in average annual gross revenues from non-blacknose SCS landings ( $19,921 / 29$  incidental vessels = \$687 per vessel).

Finally, the average annual gross revenues from 2004 through 2007 from blacknose shark meat for the entire fishery were \$90,153. Average annual gross revenues for blacknose shark fins were \$81,957, making total average annual gross revenues for blacknose shark landings for the entire fishery \$172,110 (Table 6.8). Directed permit holders landed approximately 93 percent of the blacknose shark landings whereas incidental permit holders landed approximately 7 percent of the blacknose shark total landings. Thus, directed permit holders earned approximately \$160,062 in average annual gross revenues from blacknose shark landings where as incidental permit holders earned approximately \$12,048 from blacknose shark landings (Table 6.8). Spread amongst the directed and incidental permit holders that landed blacknose sharks, the average directed permit holder earned \$3,638 in average annual gross revenues ( $\$160,062 / 44$  directed vessels = \$3,638 per vessel), and the average incidental permit holder earned \$1,721 in average annual gross revenues from blacknose shark landings ( $\$12,048 / 7$  incidental vessels = \$1,721 per vessel).

**Table 6.8** Average ex-vessel prices and average annual gross revenues from 2004-2007 under the No Action alternative, A1. Shark fins are assumed to be 5 percent of the carcass weight.

Species	Average Landings (lb dw)	Average Ex-Vessel Price	Average Annual Gross Revenues
<i>Entire Fishery</i>			
SCS	659,459	\$0.66	\$435,243
Fins	32,973	\$12.00	\$395,675
Total			\$830,918
<i>Non-Blacknose SCS</i>			
SCS	522,864	\$0.67	\$350,319
Fins	26,143	\$12.00	\$313,718
Total			\$664,037
<i>Blacknose</i>			
Blacknose	136,595	\$0.66	\$90,153
Fins	6,830	\$12.00	\$81,957
Total			\$172,110
<i>Directed Fishery</i>			
SCS	639,675	\$0.66	\$422,185
Fins	31,984	\$12.00	\$383,805
Total			\$805,990

Species	Average Landings (lb dw)	Average Ex-Vessel Price	Average Annual Gross Revenues
Non-Blacknose SCS	507,178	\$0.67	\$339,809
Fins	25,359	\$12.00	\$304,307
Total			\$644,116
Blacknose	127,033	\$0.66	\$83,842
Fins	6,352	\$12.00	\$76,220
Total			\$160,062
<i>Incidental Fishery</i>			
SCS	19,784	\$0.66	\$13,057
Fins	989	\$12.00	\$11,870
Total			\$24,928
Non-Blacknose SCS	15,686	\$0.67	\$10,510
Fins	784	\$12.00	\$9,412
Total			\$19,921
Blacknose	9,562	\$0.66	\$6,311
Fins	478	\$12.00	\$5,737
Total			\$12,048

Under the revised alternative A2, NMFS would remove blacknose sharks from the SCS quota and create a blacknose shark-specific quota of 12.1 mt dw and a separate “non-blacknose SCS” quota, which would apply to finetooth, Atlantic sharpnose, and bonnethead sharks, of 221.6 mt dw. Alternative A2 would set the non-blacknose SCS quota at a level equal to the average landings from 2004 through 2008, and the blacknose quota at a level that is a 78-percent reduction of the average landings for the same period. Therefore, unless landings increased over previous years, neutral social impacts would be anticipated for the 68 directed shark permit holders and 29 incidental shark permit holders that had non-blacknose SCS landings based on the non-blacknose SCS quota. These fishermen would be expected to fish as they currently do under the No Action alternative, and shark dealers and other entities that deal with shark products would be expected to operate as they do under the No Action alternative. Average annual gross revenues for non-blacknose SCS landings for the entire fishery are anticipated to decline by approximately 7-percent to \$620,445 (Table 6.9), representing a difference of \$43,592. Under alternative A2, the annual gross revenue across the entire fishery for blacknose sharks is expected to be \$33,611 (Table 6.9), which is a decrease of \$138,499 from the No Action alternative total of \$172,110 (Table 6.8). This would represent a decrease of 80-percent in revenue from blacknose sharks.

Since directed shark permit holders accounted for 97-percent of non-blacknose SCS landings, under Alternative A2, the total revenue for these fishermen would be \$601,832 (a loss of \$42,284 compared to the status quo). Spread across the 68 directed shark permit holders that reported non-blacknose landings, this would result in a per boat decrease of \$622 ( $\$42,284 / 68 \text{ directed vessels} = \$622$ ). With incidental shark permit holders accounting for 3-percent of the annual revenue from non-blacknose landings, based on alternative A2 there would be a decrease of \$1,308, or 7-percent, to \$18,613

(Table 6.9) from the No Action Alternative of \$19,921 (Table 6.8). This would result in a loss in revenue from non-blacknose SCS per incidental vessel of \$45 ( $\$1,308 / 29$  incidental vessels = \$45). Therefore, social and economic impacts of the non-blacknose SCS quota on fishermen with directed and incidental shark permit would be slightly negative under alternative A2.

The blacknose shark quota for alternative A2 of 12.1 mt dw would be a 78 percent reduction in landings based on average landings from 2004 through 2008. Thus, negative social impacts would be anticipated from the new blacknose shark quota for the 44 vessels with directed shark permits and 7 vessels with incidental shark permits that had blacknose shark landings. These fishermen would either have to switch to other fisheries to make up for lost blacknose landings and revenues or leave the fishery. In addition, shark dealers and other entities that deal with blacknose shark products would be indirectly affected by the reduced blacknose quota; these businesses would need to diversify to make up for lost blacknose product and could experience negative social impacts by this alternative. Average annual gross revenues for the blacknose shark landings for the entire fishery would decrease from \$172,110 (Table 6.8) under the No Action alternative down to \$33,611 (Table 6.9) under alternative A2 (80-percent reduction). The annual gross revenue for directed shark permit holders would decrease from \$160,062 (Table 6.8) under the No Action alternative to \$31,259 (Table 6.9), a decrease of \$128,803. The average loss per each of the 44 vessel with directed shark permits based on the reduced quota for alternative A2 would be \$2,927 ( $\$128,803 / 44$  directed shark vessels = \$2,927). The annual revenue from blacknose sharks for incidental shark permit holders based on the quota for alternative A2 would be \$2,353, down from the No Action alternative of \$12,048 (Table 6.8). This would result in a loss of \$9,695, or a per vessel loss of \$1,385 ( $\$9,695 / 7$  incidental vessels = \$1,385). The economic impact per vessel for those vessels that reported blacknose shark landings would be negative.

**Table 6.9** Average ex-vessel prices and average annual gross revenues from 2004-2007 under alternative A2. Shark fins are assumed to be 5 percent of the carcass weight.

Species	Average Landings (lb dw)	Average Ex-Vessel Price	Average Annual Gross Revenues
<i>Entire Fishery</i>			
Non-Blacknose SCS	488,539	\$0.67	\$327,321
Fins	24,427	\$12.00	\$293,124
Total			\$620,445
Blacknose	26,676	\$0.66	\$17,605
Fins	1,334	\$12.00	\$16,005
Total			\$33,611
<i>Directed Fishery</i>			
Non-Blacknose SCS	473,883	\$0.67	\$317,502
Fins	23,694	\$12.00	\$284,330
Total			\$601,832
Blacknose	24,808	\$0.66	\$16,374
Fins	1,240	\$12.00	\$14,885

Species	Average Landings (lb dw)	Average Ex-Vessel Price	Average Annual Gross Revenues
Total			\$31,259
<i>Incidental Fishery</i>			
Non-Blacknose SCS	14,656	\$0.67	\$9,820
Fins	733	\$12.00	\$8,794
Total			\$18,613
<i>Blacknose</i>			
Blacknose	1,867	\$0.66	\$1,232
Fins	93	\$12.00	\$1,120
Total			\$2,353

Under the revised alternative A3, NMFS would remove blacknose sharks from the SCS quota and create a blacknose shark-specific quota of 19.9 mt dw and a separate “non-blacknose SCS” quota of 110.8 mt dw, which would apply to finetooth, Atlantic sharpnose, and bonnethead sharks. Given the reduction in the non-blacknose SCS quota, NMFS anticipates that the 68 directed shark permit holders and 29 incidental shark permit holders that had non-blacknose SCS landings would experience direct negative social impacts from the new non-blacknose SCS quota. These fishermen would need to fish in other fisheries to make up for lost non-blacknose SCS landings and revenues or leave the SCS fishery. In addition, shark dealers and other entities that deal with non-blacknose SCS product would be affected indirectly as these businesses would need to diversify to make up for lost revenues, which could lead to negative social impacts.

Average annual gross revenues for non-blacknose SCS landings for the entire fishery are anticipated to be \$310,222 (Table 6.10). This is a 53 percent reduction in average annual gross revenues compared to the average annual gross revenues expected under the No Action alternative, A1 (*i.e.*, \$664,037; Table 6.8). Since directed permit holders are responsible for approximately 97 percent of the non-blacknose SCS landings, as explained in alternative A1, NMFS anticipates that directed shark permit holders would lose more in average annual gross revenues from lost non-blacknose SCS landings compared to incidental shark permit holders under alternative A3. Thus, directed shark permit holders would experience larger direct negative social impacts compared to incidental shark permit holders who are less reliant on shark revenues. In total, average annual gross revenues for directed shark permit holders of non-blacknose SCS under alternative A3 would be \$300,916 (Table 6.10), which is a loss of \$343,200 in average annual gross revenues or a 53-percent reduction in average annual gross revenues compared to the average annual gross revenues under the No Action alternative, A1 (*i.e.*, \$644,116; Table 6.8). Spread amongst the directed shark permit holders that land non-blacknose SCS, this is an anticipated loss of \$5,047 in average annual gross revenues from non-blacknose SCS landings per permit holder ( $\$343,200 / 68$  directed vessels = \$5,047 per vessel). Incidental shark permit holders land approximately 3-percent of the non-blacknose SCS landings as explained in alternative A1. In total, average annual gross revenues for incidental shark permit holders of non-blacknose SCS under alternative A3 would be \$9,307 (Table 6.10), which is a loss of \$10,614, or a 53-percent reduction, in average annual gross revenues compared to the average annual gross revenues under the No Action alternative, A1 (*i.e.*, \$19,921; Table 6.8). These lost

revenues could translate into negative social impacts as fishermen with incidental shark permits would need to change fishing practices to make up for lost non-blacknose SCS landings. Spread amongst the incidental shark permit holders that land non-blacknose SCS, this is an anticipated loss of \$366 in average annual gross revenues from non-blacknose SCS landings per permit holder ( $\$10,614 / 29$  incidental vessels = \$366 per vessel).

Under the new quotas for alternative A3, the blacknose shark quota would be reduced by 64-percent to 19.9 mt dw based on average landings from 2004 through 2008. Thus, the 44 directed shark permit holders and 7 incidental shark permit holders that had blacknose shark landings would experience direct negative social impacts from the new blacknose shark quota as they would most likely have to fish in other fisheries to make up for lost blacknose landings or leave the fishing industry altogether. Other entities that deal with blacknose shark products, such as shark dealers, would indirectly experience negative social impacts as they would also have to change their business practices to make up for lost blacknose shark product. In total, average annual gross revenues for the blacknose shark landings for the directed shark permit holders would decrease from \$160,062 under the No Action alternative (Table 6.8) down to \$51,409 under alternative A3 (Table 6.10), a loss of \$108,653 or a 68-percent reduction. Spread amongst the directed shark permit holders that land blacknose sharks, there could be an anticipated loss of \$2,469 in average annual gross revenues from blacknose landings per permit holder ( $\$108,653 / 44$  directed vessels = \$2,469 per vessel). For incidental shark permit holders the 68-percent reduction in blacknose shark landings would translate into an average annual gross revenue of \$3,869 (Table 6.10), which would be a loss of income of \$8,179 from the annual average of \$12,048 under the No Action alternative (Table 6.8). Spread amongst the 7 incidental shark permit holders, this would result in an annual loss of \$1,168 per permit holder ( $\$8,179 / 7$  incidental vessels = \$1,168).

**Table 6.10** Average ex-vessel prices and average annual gross revenues from 2004-2007 under alternative A3. Shark fins are assumed to be 5 percent of the carcass weight.

Species	Average Landings (lb dw)	Average Ex-Vessel Price	Average Annual Gross Revenues
<i>Entire Fishery</i>			
Non-Blacknose SCS	244,270	\$0.67	\$163,661
Fins	12,213	\$12.00	\$146,562
Total			\$310,222
<i>Directed Fishery</i>			
Non-Blacknose SCS	236,942	\$0.67	\$158,751
Fins	11,847	\$12.00	\$142,165
Total			\$300,916
Blacknose	40,801	\$0.66	\$26,928
Fins	2,040	\$12.00	\$24,480
Total			\$51,409
<i>Incidental Fishery</i>			
Non-Blacknose SCS	7,328	\$0.67	\$4,910
Fins	366	\$12.00	\$4,397

Species	Average Landings (lb dw)	Average Ex-Vessel Price	Average Annual Gross Revenues
Total			\$9,307
Blacknose	3,071	\$0.66	\$2,027
Fins	154	\$12.00	\$1,843
Total			\$3,869

Under the revised alternative A4, NMFS would remove blacknose sharks from the SCS quota and create a blacknose shark-specific quota and a separate non-blacknose SCS quota equal to 55.4 mt dw, which would apply to finetooth, Atlantic sharpnose, and bonnethead sharks. The non-blacknose SCS quota would be based on a 75-percent reduction of the average current landings of finetooth, Atlantic sharpnose, and bonnethead sharks from 2004 through 2008 (Table 6.11). NMFS determined that by reducing the overall SCS fishery, NMFS could reduce the level of blacknose shark discards such that the total blacknose shark mortality would stay below the commercial allowance (see Appendix A). The blacknose shark quota would be set at 15.9 mt dw under alternative A4, which is the amount of blacknose sharks that would be landed while the non-blacknose SCS quota is taken (see Appendix A) assuming that fishermen with a directed shark permit would fish for SCS in a directed fashion until the non-blacknose SCS and/or blacknose shark quota reached 80-percent. This alternative assumes that gillnet gear would not be used to harvest sharks as detailed under alternatives B2 and B3.

Given the reduction in the non-blacknose SCS quota, NMFS anticipates that the 41 directed shark permit holders and 22 incidental shark permit holders that did not use gillnet gear to land non-blacknose SCS could experience significant negative social and economic impacts from the new non-blacknose SCS quota. These fishermen would experience direct negative social impacts as they would need to fish in other non-gillnet fisheries to make up for lost non-blacknose SCS landings and revenues. In addition, shark dealers and other entities that deal with non-blacknose SCS product would be affected indirectly as these businesses would need to diversify to make up for lost revenues, which could lead to negative social impacts. Average annual gross revenues for non-blacknose SCS landings for the entire fishery are anticipated to be \$155,111 (Table 6.11). This is a 77-percent reduction in average annual gross revenues compared to the average annual gross revenues expected under the No Action alternative, A1 (*i.e.*, \$664,037; Table 6.8). Since directed shark permit holders land approximately 97-percent of the non-blacknose SCS landings as explained in alternative A1, NMFS anticipates that directed shark permit holders would lose more in average annual gross revenues from lost non-blacknose SCS landings compared to incidental shark permit holders under alternative A4. Thus, directed shark permit holders would experience larger direct negative social impacts compared to incidental shark permit holders who are less reliant on shark revenues. Average annual gross revenues of non-blacknose SCS for directed shark permit holders under alternative A4 would be \$150,458 (Table 6.11), which is a loss of \$493,658 in average annual gross revenues, or a 77-percent reduction, compared to the average annual gross revenues under the No Action alternative, A1 (*i.e.*, \$644,116; Table 6.8). Spread amongst the directed shark permit holders who did not use gillnet

gear to land non-blacknose SCS, there could be an anticipated loss of \$12,040 in average annual gross revenues from non-blacknose SCS landings per permit holder ( $\$493,658 / 41$  directed vessels = \$12,040 per vessel). Incidental shark permit holders land approximately 3-percent of the non-blacknose SCS landings as explained in alternative A1. These lost revenues could translate into negative social impacts as fishermen with incidental shark permits would need to change fishing practices to make up for lost non-blacknose SCS landings. Average annual gross revenues for incidental shark permit holders of non-blacknose SCS under alternative A4 would be \$4,653 (Table 6.11), which is a loss of \$15,268 in average annual gross revenues, or a 77-percent reduction, compared to the average annual gross revenues under the No Action alternative, A1 (*i.e.*, \$19,921; Table 6.8). Spread amongst the incidental shark permit holders that did not use gillnet gear to land non-blacknose SCS, there could be an anticipated loss of \$694 in average annual gross revenues from non-blacknose SCS landings per permit holder ( $\$15,268 / 22$  incidental vessels = \$694 per vessel).

Under alternative A4, the blacknose shark quota would also be reduced by 72 percent based on average landings from 2004 through 2008. Thus, the 15 directed shark permit holders and 5 incidental shark permit holders that did not use gillnet gear to land blacknose sharks would experience direct negative social impacts from the new blacknose shark quota as they would most likely have to fish in other fisheries to make up for lost blacknose landings or leave the fishing industry altogether. Other entities that deal with blacknose shark products, such as shark dealers, would indirectly experience negative social impacts as they would also have to change their business practices to make up for lost blacknose shark product. Average annual gross revenues for the blacknose shark landings for the directed fishery would decrease from \$160,062 under the No Action alternative, A1, (Table 6.8) down to \$41,075 under alternative A4 (Table 6.11), which is a loss of \$118,987, or a 74-percent reduction, in average annual gross revenues from blacknose sharks for fishermen with directed shark permits. Spread amongst the directed shark permit holders that did not use gillnet gear to land blacknose sharks, there could be an anticipated loss of \$7,932 in average annual gross revenues from blacknose landings per permit holder ( $\$118,987 / 15$  directed vessels = \$7,932 per vessel). For incidental shark permit holders this would translate into average annual gross revenue of \$3,092 (Table 6.11), which would be a loss of income of \$8,956 from the annual average of \$12,048 under the No Action alternative (Table 6.8). Spread amongst the 5 incidental shark permit holders that do not use gillnets, this would result in an annual loss of \$1,791 per permit holder ( $\$8,956 / 5$  incidental vessels = \$1,791).

**Table 6.11** Average ex-vessel prices and average annual gross revenues for entire fishery from 2004-2007 under alternative A4. Shark fins are assumed to be 5 percent of the carcass weight.

Species	Average Landings (lb dw)	Average Ex-Vessel Price	Average Annual Gross Revenues
<i>Entire Fishery</i>			
Non-Blacknose SCS	122,135	\$0.67	\$81,830
Fins	6,107	\$12.00	\$73,281
Total			\$155,111
Blacknose	35,053	\$0.66	\$23,135
Fins	1,753	\$12.00	\$21,032
Total			\$44,167
<i>Directed Fishery</i>			
Non-Blacknose SCS	118,471	\$0.67	\$79,375
Fins	5,924	\$12.00	\$71,082
Total			\$150,458
Blacknose	32,599	\$0.66	\$21,516
Fins	1,630	\$12.00	\$19,560
Total			\$41,075
<i>Incidental Fishery</i>			
Non-Blacknose SCS	3,664	\$0.67	\$2,455
Fins	183	\$12.00	\$2,198
Total			\$4,653
Blacknose	2,454	\$0.66	\$1,619
Fins	123	\$12.00	\$1,472
Total			\$3,092

Alternative A4 would also prohibit the use of gillnets to land sharks as explained under alternatives B2 and B3. Alternative B2 would prohibit the landings of sharks with gillnet gear in the Atlantic, Gulf of Mexico, and Caribbean Sea. Therefore, the approximate 27 directed and 7 incidental shark permit holders that used gillnet gear to land non-blacknose SCS and the approximate 15 directed and 2 incidental shark permit holders that used gillnet gear to land blacknose sharks would experience additional losses under alternatives A4 and B2. Under alternatives A4 and B2, lost average annual gross revenues for all shark permit holders landing non-blacknose SCS using gillnet gear would be \$287,427 (Table 6.12). This is approximately 43 percent of the average annual gross revenues for the entire non-blacknose SCS fishery under the No Action alternative, A1 (*i.e.*, \$664,037; Table 6.8). Lost average annual gross revenues for directed shark permit holders using gillnet gear to land non-blacknose SCS under alternative A4 would be \$275,832 (Table 6.12), which is 45 percent of the average annual gross revenues for

directed shark permit holders under the No Action alternative, A1 (*i.e.*, \$644,116; Table 6.8). Spread amongst the directed shark permit holders that land non-blacknose SCS with gillnet gear, this is an anticipated loss of \$10,216 in average annual gross revenues from non-blacknose SCS landings per permit holder ( $\$275,832 / 27$  directed vessels = \$10,216 per vessel). However, since there are 5-7 gillnet vessels that primarily target non-blacknose SCS with gillnet gear, these permit holders may experience higher losses. Lost average annual gross revenues for incidental shark permit holders using gillnet gear to land non-blacknose SCS under alternative A4 would be \$11,595 (Table 6.12), which is 57 percent of the average annual gross revenues for incidental permit holders under the No Action alternative, A1 (*i.e.*, \$19,921; Table 6.8). Spread amongst the incidental shark permit holders that use gillnet gear to land non-blacknose SCS, this is an anticipated loss of \$1,656 in average annual gross revenues from non-blacknose SCS landings per permit holder ( $\$11,595 / 7$  incidental vessels = \$1,656 per vessel).

Lost average annual gross revenues for all shark permit holders landing blacknose sharks using gillnet gear under alternatives A4 and B2 would be \$90,501 (Table 6.12). This is approximately 53 percent of the average annual gross revenues for the entire non-blacknose SCS fishery under the No Action alternative, A1 (*i.e.*, \$172,110; Table 6.8). Lost average annual gross revenues for directed shark permit holders using gillnet gear to land blacknose sharks under alternatives A4 and B2 would be \$90,123 (Table 6.12), which is 56 percent of the average annual gross revenues for directed permits holder under the No Action alternative, A1 (*i.e.*, \$160,062; Table 6.8). Spread amongst the directed shark permit holders that land blacknose sharks with gillnet gear, this would be a loss of \$6,008 in average annual gross revenues from blacknose shark landings per permit holder ( $\$90,123 / 15$  directed vessels = \$6,008 per vessel). However, since there are 5-7 gillnet vessels that primarily target blacknose sharks with gillnet gear, these permit holders may experience higher losses. Incidental permit holders would not be allowed to retain any blacknose sharks under alternative A4, whether or not they used gillnet gear. Lost average annual gross revenues for incidental shark permit holders using gillnet gear to land blacknose sharks under alternatives A4 and B2 would be \$378 (Table 6.12), which is 2 percent of the average annual gross revenues for incidental permit holders under the No Action alternative, A1 (*i.e.*, \$19,921; Table 6.8). Spread amongst the incidental shark permit holders that use gillnet gear to land blacknose sharks, this is an anticipated loss of \$189 in average annual gross revenues from non-blacknose SCS landings per permit holder ( $\$378 / 2$  incidental vessels = \$189 per vessel).

Under alternatives A4 and B3, which would prohibit the landings of sharks with gillnet gear from South Carolina south, including the Gulf of Mexico and Caribbean Sea, approximately 24 directed and 5 incidental shark permit holders that used gillnet gear to land non-blacknose SCS and approximately 13 directed and 2 incidental shark permit holders that used gillnet gear to land blacknose sharks would experience additional losses under alternatives A4 and B3. Lost average annual gross revenues for all shark permit holders landing non-blacknose SCS using gillnet gear would be \$275,008 under alternatives A4 and B3 (Table 6.12). This is approximately 42 percent of the average annual gross revenues for the entire non-blacknose SCS fishery under the No Action alternative, A1 (*i.e.*, \$664,037; Table 6.8). Lost average annual gross revenues for

directed shark permit holders using gillnet gear to land non-blacknose SCS under alternatives A4 and B3 would be \$268,580 (Table 6.12), which is 42 percent of the average annual gross revenues for directed permits holder under the No Action alternative, A1 (*i.e.*, \$644,116; Table 6.8). Spread amongst the directed shark permit holders that land non-blacknose SCS with gillnet gear, this is an anticipated loss of \$11,191 in average annual gross revenues from non-blacknose SCS landings per permit holder ( $\$268,580 / 24$  directed vessels = \$11,191 per vessel). However, as with alternatives A4 and B2, since there are 5-7 gillnet vessels that primarily target non-blacknose SCS with gillnet gear, these permit holders may experience higher losses. Lost average annual gross revenues for incidental shark permit holders using gillnet gear to land non-blacknose SCS under alternatives A4 and B3 would be \$6,429 (Table 6.12), which is 31 percent of the average annual gross revenues for incidental permit holders under the No Action alternative, A1 (*i.e.*, \$19,921; Table 6.8). Spread amongst the incidental shark permit holders that use gillnet gear to land non-blacknose SCS, this is an anticipated loss of \$1,286 in average annual gross revenues from non-blacknose SCS landings per permit holder ( $\$6,429 / 5$  incidental vessels = \$1,286 per vessel).

Lost average annual gross revenues for all shark permit holders landing blacknose sharks using gillnet gear under alternatives A4 and B3 would be \$90,059 (Table 6.12). This is approximately 53 percent of the average annual gross revenues for the entire non-blacknose SCS fishery under the No Action alternative, A1 (*i.e.*, \$172,110; Table 6.8). Lost average annual gross revenues for directed shark permit holders using gillnet gear to land blacknose sharks under alternatives A4 and B3 would be \$89,681 (Table 6.12), which is 56 percent of the average annual gross revenues for directed permits holder under the No Action alternative, A1 (*i.e.*, \$160,062; Table 6.8). Spread amongst the directed shark permit holders that land blacknose sharks with gillnet gear, this would be a loss of \$6,899 in average annual gross revenues from blacknose shark landings per permit holder ( $\$89,681 / 13$  directed vessels = \$6,899 per vessel). However, as with alternatives A4 and B2, since there are 5-7 gillnet vessels that primarily target blacknose sharks with gillnet gear, these permit holders may experience higher losses. Incidental permit holders would not be allowed to retain any blacknose sharks under alternative A4, whether or not they used gillnet gear. Lost average annual gross revenues for incidental shark permit holders using gillnet gear to land blacknose sharks under alternatives A4 and B3 would be \$378 (Table 6.12), which is 2 percent of the average annual gross revenues for incidental permit holders under the No Action alternative, A1 (*i.e.*, \$19,921; Table 6.8). Spread amongst the incidental shark permit holders that use gillnet gear to land blacknose sharks, this is an anticipated loss of \$189 in average annual gross revenues from non-blacknose SCS landings per permit holder ( $\$378 / 2$  incidental vessels = \$189 per vessel).

**Table 6.12** Lost average annual gross revenues (from 2004-2007) for vessels that fish for non-blacknose SCS and blacknose sharks with gillnet gear under alternative A4. Shark fins are assumed to be 5 percent of the carcass weight.

Species	Average Landings (lb dw)	Average Ex-Vessel Price	Average Annual Gross Revenues
<i>Under Alternative B2</i>			
<i>Entire Fishery</i>			
Non-Blacknose SCS	227,184	\$0.67	\$151,162
Fins	11,359	\$12.00	\$136,265
Total			\$287,427
Blacknose	71,827	\$0.66	\$47,406
Fins	3,591	\$12.00	\$43,096
Total			\$90,501
<i>Directed Fishery</i>			
Non-Blacknose SCS	218,019	\$0.67	\$145,064
Fins	10,901	\$12.00	\$130,768
Total			\$275,832
Blacknose	71,527	\$0.66	\$47,208
Fins	3,576	\$12.00	\$42,916
Total			\$90,123
<i>Incidental Fishery</i>			
Non-Blacknose SCS	9,165	\$0.67	\$6,098
Fins	458	\$12.00	\$5,497
Total			\$11,595
Blacknose	300	\$0.66	\$198
Fins	15	\$12.00	\$180
Total			\$378
<i>Under Alternative B3</i>			
<i>Entire Fishery</i>			
Non-Blacknose SCS	217,368	\$0.67	\$144,631
Fins	10,868	\$12.00	\$130,377
Total			\$275,008
Blacknose	71,475	\$0.66	\$47,174
Fins	3,574	\$12.00	\$42,885
Total			\$90,059
<i>Directed Fishery</i>			
Non-Blacknose SCS	212,287	\$0.67	\$141,250

Species	Average Landings (lb dw)	Average Ex-Vessel Price	Average Annual Gross Revenues
Fins	10,614	\$12.00	\$127,329
Total			\$268,580
Blacknose	71,175	\$0.66	\$46,976
Fins	3,559	\$12.00	\$42,705
Total			\$89,681
<i>Incidental Fishery</i>			
Non-Blacknose SCS	5,081	\$0.67	\$3,381
Fins	254	\$12.00	\$3,048
Total			\$6,429
Blacknose	300	\$0.66	\$198
Fins	15	\$12.00	\$180
Total			\$378

In addition, LCS are also landed with gillnet gear. Therefore, alternative A4 in combination with alternatives B2 and B3 would also impact LCS fishermen using gillnet gear. Therefore, the approximate 11 directed and 5 incidental shark permit holders that used gillnet gear to land LCS would experience additional losses under alternatives A4 and B2. Under alternatives A4 and B2, which would prohibit the landings of sharks with gillnet gear in the Atlantic, Gulf of Mexico, and Caribbean Sea, lost average annual gross revenues for all vessels landing LCS using gillnet gear would be \$109,339 (Table 6.13). This is approximately 3 percent of the average annual gross revenues for the entire LCS fishery under the No Action alternative, A1 (*i.e.*, \$3,328,663; Table 6.14). Under alternatives A4 and B2, LCS fishermen that do not use gillnet gear to land LCS would earn average annual gross revenues of \$3,219,324 from LCS landings, which is approximately 97 percent of the average annual gross revenues from LCS landings under the status quo (Table 6.14). Lost average annual gross revenues for directed shark permit holders using gillnet gear to land LCS under alternative A4 would be \$107,280 (Table 6.13). Spread amongst the directed shark permit holders that land LCS with gillnet gear, this is an anticipated loss of \$9, 753 in average annual gross revenues from LCS landings per permit holder ( $\$107,280 / 11$  directed vessels = \$9,753 per vessel). Lost average annual gross revenues for incidental shark permit holders using gillnet gear to land LCS under alternative A4 would be \$2,059 (Table 6.13). Spread amongst the incidental shark permit holders that use gillnet gear to land LCS, this is an anticipated loss of \$412 in average annual gross revenues from non-blacknose SCS landings per permit holder ( $\$2,059 / 5$  incidental vessels = \$412 per vessel).

Under alternatives A4 and B3, which would prohibit the landings of sharks with gillnet gear from South Carolina south, including the Gulf of Mexico and Caribbean Sea, approximately 10 directed shark permit holders and 2 incidental shark permit holders that used gillnet gear to land LCS would experience additional losses. As explained above, if these LCS fishermen also rely on SCS catches, then they would be expected to experience significant, direct negative social impacts as they would have to change their fishing practices and work in other fisheries. Fishermen with incidental shark permits

would also experience direct negative social impacts as they would have to change their fishing practices and switch to other fisheries to make up for lost shark revenues. Shark dealers and other entities that purchase shark products from shark gillnet fishermen would experience indirect negative social impacts as they would have to diversify to make up for lost shark product. However, social impacts from lost LCS revenues alone under alternatives A4 and B3, as described below, are expected to be minimal. Lost average annual gross revenues for all vessels landing LCS using gillnet gear would be \$106,479 under alternatives A4 and B3 (Table 6.13). This is approximately 3 percent of the average annual gross revenues for the entire LCS fishery under the status quo (*i.e.*, \$3,328,663; Table 6.14). Under alternatives A4 and B3, LCS fishermen that do not use gillnet gear to land LCS would earn average annual gross revenues of \$3,222,183 from LCS landings, which is approximately 97 percent of the average annual gross revenues under the status quo (Table 6.14). Lost average annual gross revenues for directed shark permit holders using gillnet gear to land LCS under alternatives A4 and B3 would be \$106,189 (Table 6.13). Spread amongst the directed shark permit holders that land LCS with gillnet gear, this is an anticipated loss of \$10,619 in average annual gross revenues from LCS landings per permit holder ( $\$106,189 / 10$  directed vessels = \$10,619 per vessel). Lost average annual gross revenues for incidental shark permit holders using gillnet gear to land LCS under alternatives A4 and B3 would be \$290 (Table 6.13). Spread amongst the incidental shark permit holders that use gillnet gear to land LCS, this is an anticipated loss of \$145 in average annual gross revenues from non-blacknose SCS landings per permit holder ( $\$290 / 2$  incidental vessels = \$145 per vessel).

**Table 6.13** Lost average annual gross revenues (from 2004-2007) for vessels that fish for LCS with gillnet gear under alternative A4. Shark fins are assumed to be 5 percent of the carcass weight.

Species	Average Landings (lb dw)	Average Ex-Vessel Price	Average Annual Gross Revenues
<i>Under Alternative B2</i>			
<i>Entire Fishery</i>			
LCS	104,132	\$0.45	\$46,859
Fins	5,207	\$12.00	\$62,479
Total			\$109,339
<i>Directed Fishery</i>			
LCS	102,171	\$0.45	\$45,977
Fins	5,109	\$12.00	\$61,303
Total			\$107,280
<i>Incidental Fishery</i>			
LCS	1,961	\$0.45	\$882
Fins	98	\$12.00	\$1,177
Total			\$2,059
<i>Under Alternative B3</i>			
<i>Entire Fishery</i>			
LCS	101,409	\$0.45	\$45,634
Fins	5,070	\$12.00	\$60,845

Species	Average Landings (lb dw)	Average Ex-Vessel Price	Average Annual Gross Revenues
Total			\$106,479
<i>Directed Fishery</i>			
LCS	101,132	\$0.45	\$45,509
Fins	5,057	\$12.00	\$60,679
Total			\$106,189
<i>Incidental Fishery</i>			
LCS	276	\$0.45	\$124
Fins	14	\$12.00	\$166
Total			\$290

**Table 6.14** Average annual gross revenues (from 2004-2007) of vessels that land LCS but do not use gillnet gear under alternative A4. Shark fins are assumed to be 5 percent of the carcass weight.

Species	Average Landings (lb dw)	Average Ex-Vessel Price	Average Annual Gross Revenues
<i>Status Quo</i>			
LCS	3,170,155	\$0.45	\$1,426,570
Fins	158,508	\$12.00	\$1,902,093
Total			\$3,328,663
<i>Under Alternative B2</i>			
<i>Entire Fishery</i>			
LCS	3,066,023	\$0.45	\$1,379,710
Fins	153,301	\$12.00	\$1,839,614
Total			\$3,219,324
<i>Under Alternative B3</i>			
<i>Entire Fishery</i>			
LCS	3,068,746	\$0.45	\$1,380,936
Fins	153,437	\$12.00	\$1,841,248
Total			\$3,222,183

Alternative A5 would close the entire SCS commercial shark fishery, prohibiting the landing of any SCS, including blacknose sharks. Thus, this alternative would eliminate landings of all SCS, including finetooth, Atlantic sharpnose, bonnethead, and blacknose sharks. This would have negative economic impacts on the average 85 directed shark permit holders, and the average 31 incidental shark permit holders that had SCS landings during 2004-2007. This would result in a loss of average annual gross revenues of \$664,037 for non-blacknose SCS and \$172,110 from blacknose shark landings for a total loss of \$830,918 in average annual gross revenues from SCS landings. Directed shark permit holders would lose \$644,116 in average annual gross revenues from non-blacknose SCS landings and \$160,062 in average annual gross revenues from blacknose shark landings for a total of \$805,990 in average annual gross revenues (Table 6.15). Spread among the 85 directed shark permit holders that land LCS with gillnet

gear, this could result in a loss in average annual gross revenues of \$9,482 per permit holder ( $\$805,990 / 85 \text{ vessels} = \$9,482$ ).

Incidental permit holders would lose \$19,921 in average annual gross revenues from non-blacknose SCS landings and \$12,048 in average annual gross revenues from blacknose shark landings for a total of \$31,969 in average annual gross revenues under alternative A5 (Table 6.15). Spread among the 31 incidental shark permit holders that land SCS, this could result in a loss in average annual gross revenues of \$1,031 per permit holder ( $\$31,969 / 31 \text{ incidental vessels} = \$1,031$ ).

In addition, as gillnet gear is the primary gear used to target SCS, it is assumed that directed shark gillnet fishing would end, except for fishermen that use gillnet gear to strikenet for blacktip sharks. Approximately 11 directed shark permit holders use gillnet gear to land LCS. This would result in a decrease in LCS landings of 102,171 lb dw and a decrease in average annual gross revenues of \$107,280. Spread among the 11 directed shark permit holders that land LCS with gillnet gear, this could result in a loss in average annual gross revenues of \$9,753 per permit holder ( $\$107,280 / 11 \text{ vessels} = \$9,753$ ). However, while this alternative could reduce blacknose mortality below the commercial allowance of 44,854 lb dw, it would also completely eliminate the fishery for all SCS. This would severely curtail data collection on all SCS that could be used for future stock assessments.

**Table 6.15** Lost average annual gross revenues (from 2004-2007) for vessels landings non-blacknose SCS, blacknose sharks, and LCS under alternative A5. Shark fins are assumed to be 5 percent of the carcass weight.

Species	Average Landings (lb dw)	Average Ex-Vessel Price	Average Annual Gross Revenues
<i>Entire Fishery</i>			
Non-Blacknose SCS	522,864	\$0.67	\$350,319
Fins	26,143	\$12.00	\$313,718
Total			\$664,037
Blacknose	136,595	\$0.66	\$90,153
Fins	6,830	\$12.00	\$81,957
Total			\$172,110
<i>Directed Fishery</i>			
Non-Blacknose SCS	507,178	\$0.67	\$339,809
Fins	25,359	\$12.00	\$304,307
Total			\$644,116
Blacknose	127,033	\$0.66	\$83,842
Fins	6,352	\$12.00	\$76,220
Total			\$160,062
LCS	102,171	\$0.45	\$45,977
Fins	5,109	\$12.00	\$61,303
Total			\$107,280
<i>Incidental Fishery</i>			
Non-Blacknose SCS	15,686	\$0.67	\$10,510
Fins	784	\$12.00	\$9,412
Total			\$19,921
Blacknose	9,562	\$0.66	\$6,311
Fins	478	\$12.00	\$5,737
Total			\$12,048

Alternative A6, the preferred alternative, combines parts of alternatives A2 and A3 that would establish a blacknose species-specific quota of 19.9 mt dw and a non-blacknose SCS quota of 221.6 mt dw. Alternative A6 would set the non-blacknose SCS quota at a level equal to the average annual landings from 2004 through 2008, and the blacknose quota at a level that is a 64-percent reduction of the average landings for that species over the same time period. This alternative comes in response to recently updated SEFSC data used for analysis, and in response to concerns raised by the commercial and scientific communities during the comment period for the DEIS. Under alternative A6 all currently authorized gears for shark fishing would be allowed in the fishery.

Under the non-blacknose SCS quota in preferred alternative A6, those fishermen with the 68 directed shark permits and 29 incidental shark permits that had non-blacknose SCS landings would be expected to fish as they currently do under the No Action

alternative, and shark dealers and other entities that deal with shark products would be expected to operate as they do under the No Action alternative. Average annual gross revenues for non-blacknose SCS landings for the entire fishery are anticipated to decline by approximately 6-percent compared to the No Action alternative, to \$620,445, (Table 6.16) under alternative A6, representing a revenue loss of \$43,593. Average annual gross revenue for blacknose shark landings for the entire fishery is expected to decline to \$55,278, a loss of \$ 116,832.

Since directed shark permit holder accounted for 97 percent of the landings for non-blacknose SCS, the total revenue for these fishermen would decrease by 6 percent to \$601,832 (Table 6.16), a loss of \$42,284 from the No Action alternative non-blacknose directed shark permit revenue total of \$644,116 (Table 6.8). Spread across the 68 directed shark permit holders that reported non-blacknose landings, this would result in a per boat decrease of \$622 ( $\$42,284 / 68$  directed vessels = \$622). With incidental shark permit holders accounting for 3 percent of the annual revenue from non-blacknose landings based on alternative A6, there would be a decrease in total revenue of \$1,308, or 7 percent, to \$18,613 (Table 6.9) from the No Action Alternative of \$19,921 (Table 6.8). This would result in a loss of revenue from non-blacknose SCS per incidental vessel of \$45 ( $\$1,308 / 29$  incidental vessels = \$45). Therefore, social and economic impacts of the non-blacknose SCS quota on fishermen with directed and incidental shark permit would be slightly negative under alternative A6.

Under the blacknose shark quota of 19.9 mt dw, the 44 directed shark permit holders and 7 incidental shark permit holders that had blacknose shark landings would experience direct negative social impacts, as they would most likely have to fish in other fisheries to make up for lost blacknose landings or leave the fishery altogether. Other entities that deal with blacknose shark products, such as shark dealers, would indirectly experience negative social impacts as they would also have to change their business practices to make up for lost blacknose shark product. In total, average annual gross revenues for the blacknose shark landings for the directed shark permit holders would decrease from \$160,062 under the No Action alternative (Table 6.8) down to \$51,409 under alternative A6 (Table 6.16), which is a loss of \$108,653 or a 68 percent reduction in average annual gross revenues for blacknose sharks for directed shark fishermen. Spread amongst the directed shark permit holders that land blacknose sharks, there could be an anticipated loss of \$2,469 in average annual gross revenues from blacknose landings per permit holder ( $\$108,653 / 44$  directed vessels = \$2,469 per vessel). For incidental shark permit holders the 68-percent reduction in blacknose shark landings would translate into an average annual gross revenue of \$3,869 (Table 6.10), which would be a loss of income of \$8,179 from the annual average of \$12,048 under the No Action alternative (Table 6.8). Spread amongst the 7 incidental shark permit holders, this would result in an annual loss of \$1,168 per permit holder ( $\$8,179 / 7$  incidental vessels = \$1,168).

Under alternative A6, if either the non-blacknose SCS quota (212.6 mt dw) or blacknose shark quota (19.9 mt dw) reached 80 percent of the available landings, NMFS would close both fisheries for the rest of the season. If a future stock assessment

determines that blacknose sharks are continuing to be overfished or that overfishing is still occurring, NMFS would make changes to upcoming shark season rules. These changes may include, but are not limited to, reducing the blacknose shark quota and/or the non-blacknose SCS quota, and implementing daily blacknose catch limits. But, if it is determined that the shark fishermen are able to minimize the catch of blacknose sharks and that the new blacknose quota is helping rebuild the stock, NMFS would consider increasing the non-blacknose SCS quota to allow the commercial shark fishermen greater access.

**Table 6.16** Average ex-vessel prices and average annual gross revenues from 2004-2007 under alternative A6. Shark fins are assumed to be 5 percent of the carcass weight.

Species	Average Landings (lb dw)	Average Ex-Vessel Price	Average Annual Gross Revenues
<i>Entire Fishery</i>			
Non-Blacknose SCS	488,539	\$0.67	\$327,321
Fins	24,427	\$12.00	\$293,124
Total			\$620,445
Blacknose	43,872	\$0.66	\$28,955
Fins	2,194	\$12.00	\$26,323
Total			\$55,278
<i>Directed Fishery</i>			
Non-Blacknose SCS	473,883	\$0.67	\$317,502
Fins	23,694	\$12.00	\$284,330
Total			\$601,832
Blacknose	40,801	\$0.66	\$26,928
Fins	2,040	\$12.00	\$24,480
Total			\$51,409
<i>Incidental Fishery</i>			
Non-Blacknose SCS	14,656	\$0.67	\$9,820
Fins	733	\$12.00	\$8,794
Total			\$18,613
Blacknose	3,071	\$0.66	\$2,027
Fins	154	\$12.00	\$1,843
Total			\$3,869

Alternative A6 would reduce effort in the non-blacknose SCS fishery, but only to a level that is equal to the average landings for these species for the years 2004 through 2008. Combined with the quota for blacknose sharks, alternative A6 could reduce the level of blacknose shark discards such that the total blacknose shark mortality would stay below the commercial allowance needed in order to rebuild the stock, consistent with the objectives of this amendment. Alternative A6 would result in the smallest economic impact on the commercial shark fisheries while still meeting the goal of rebuilding the blacknose shark stocks. The anticipated annual gross lost revenue based on the non-blacknose SCS and blacknose shark quotas from alternative A6 for those vessels with

directed permits would be \$3,047, while the lost revenue for the incidental permit holders would be \$1,234.

#### ***6.4.1.2 SCS Commercial Gear Restrictions***

Under alternative B1, the preferred No Action alternative, NMFS would maintain the current gear restrictions for rod and reel, gillnet, and BLL gear. Therefore, the economic impacts of alternative B1 would be the same as the status quo, and no negative social or economic impacts would be anticipated under alternative B1. On average from 2004-2007, the directed and incidental shark permit holders retained average annual gross revenues from SCS landings of \$830,918, while the directed and incidental shark permit holders retaining LCS had larger gross revenues of \$3,328,663. The smooth dogfish fishery is smaller than the other fisheries and has average annual gross revenues of \$371,786 for state and federally permitted fishermen reporting to the ACCSP. Based on this alternative, the average annual gross revenues of these fisheries would remain the same as the status quo. The average number of directed and incidental shark permit holders that reported SCS landings in the Coastal Fisheries logbook from 2004-2007 were 116 (85 directed and 31 incidental shark permit holders), and the LCS fishery had an annual average of 162 permit holders (129 directed and 33 incidental shark permit holders) reporting LCS landings in the Coastal Fisheries logbook from 2004-2007. The number of permit holders would not be impacted by the No Action alternative.

Under alternative B2, which would close the shark gillnet fishery, NMFS would remove gillnet gear as an authorized gear type for commercial shark fishing. This alternative would have significant negative economic impacts by potentially affecting 30 directed and 7 incidental permit holders that land SCS. Also, this restriction would have a considerable impact on the total landings/year of SCS. Gillnets are the dominant gear type in the SCS fishery. On average, directed shark permit holders landed 289,546 lb dw of SCS with gillnet gear. This is equivalent to \$365,955 in lost average annual gross revenues from SCS landings for directed shark permit holders. Based on average ex-vessel prices per pound from 2004-2007, directed fishermen earned \$807,792 in average annual gross revenues from SCS landings. On average, incidental shark permit holders landed 9,465 lb dw of SCS with gillnet gear. This is equivalent to \$11,973 in lost average annual gross revenues from SCS landings for incidental shark permit holders due to the prohibition of gillnet gear. Based on average ex-vessel prices per pound from 2004-2007, incidental shark permit holders earned \$25,843 from SCS landings under the status quo. This represents a 45 percent reduction in SCS revenues for directed shark permit holders and a 46 percent reduction in SCS revenues for incidental shark permit holders compared to the No Action alternative, alternative B1.

This alternative would have a minimal negative economic impact on the LCS fishery. Only 11 directed and 5 incidental shark permit holders out of the 162 total shark permit holders would be affected. On average, directed shark permit holders landed 102,171 lb dw of LCS with gillnet gear. This is equivalent to \$107,280 in lost average annual gross revenues from LCS landings (3 percent reduction). On average, incidental shark permit holders landed 1,961 lb dw of LCS with gillnet gear. This is equivalent to

\$2,059 in lost average annual gross revenues from LCS landings for incidental shark fishermen due to the prohibition of gillnet gear. In total (\$109,339), this is approximately 3 percent of the gross revenues for the entire LCS fishery under the status quo (*i.e.*, \$3,328,663).

Gillnets are also the primary gear type used to catch smooth dogfish. Within the VTR data, a primarily Northeast U.S. reporting system, an average of 213 vessels reported smooth dogfish landings per year between 2004 and 2007. Within the Coastal Fisheries Logbooks data, a primarily Southeast U.S. reporting system, an average of 10 vessels reported smooth dogfish landings per year between 2004 and 2007. From this data, an estimate of 223 vessels would require a smooth dogfish permit; however, as fishermen are currently not required to have a permit to retain smooth dogfish, this could be an underestimate of the number of fishermen that would require a federal commercial permit for smooth dogfish in the future. The average total landings/year of smooth dogfish from 1998-2007 were 950,859 lb dw/year (by state and federally permitted fishermen reporting to the ACCSP, however, since fishermen do not have to currently report smooth dogfish landings, this could be an underestimate of total landings, and thus, an underestimate of average annual gross revenues for this fishery). Based on average ex-vessel prices per pound from 2004-2007, average annual gross revenues for the entire smooth dogfish fishery totaled \$371,786 from smooth dogfish landings. If NMFS prefers alternative F2, which would require fishermen who fish for smooth dogfish in federal waters to obtain a federal smooth dogfish permit, then under alternative B2, those fishermen would not be able to use gillnet gear to land smooth dogfish. This would have a negative economic impacts on fishermen who previously used gillnet gear in federal waters to land smooth dogfish. However, as fishermen do not have to have a federal permit currently to land smooth dogfish, NMFS is uncertain of the universe of fishermen who might be affected by alternatives B2 and F2 at this time. However, given the potential large negative economic impacts of this alternative to the SCS, LCS, and smooth dogfish fisheries, NMFS does not prefer this alternative B2 at this time.

Under alternative B3, NMFS would close the commercial gillnet fishery from South Carolina south, including the Gulf of Mexico and Caribbean Sea. This would have a negative economic impact on federally permitted directed and incidental shark permit holders. In the SCS fishery, this alternative would affect 27 directed and 5 incidental shark permit holders out of the 116 total shark permit holders that landed SCS. The SCS gillnet fishery from South Carolina south accounts for 44 percent of the total shark landings by directed shark permit holders, and 26 percent of landings by incidental permit holders. On average, directed shark permit holders landed 283,462 lb dw (\$358,261) of SCS with gillnet gear. Thus, directed shark fishermen would lose \$358,261 in average annual gross revenues from SCS landings from the gillnet prohibition under alternative B3. Based on average ex-vessel prices from 2004-2007, directed fishermen earned \$807,792 in average annual gross revenues from SCS landings. On average, incidental shark permit holders landed 5,381 lb dw (\$6,807) of SCS with gillnet gear from South Carolina south. Thus, incidental shark fishermen would lose \$6,807 in average annual gross revenues from non-blacknose SCS landings under alternative B3. The directed and

incidental shark permit holders would lose average annual gross revenues of \$365,068 from their current gross revenues of \$833,634.

This alternative would have minor economic impacts on the LCS fishery. It would only affect 12 directed and incidental shark permit holders (162 total shark permit holders). The directed shark permit holders would lose \$106,189 in average annual gross revenues from lost LCS landings in gillnet gear from South Carolina south under alternative B3. Incidental fishermen shark permit holders would lose \$290 from lost LCS landings in gillnet gear from South Carolina south. In total (\$106,479), this is only 3 percent of the average annual gross revenues (*i.e.*, \$3,328,663) from LCS landings for the LSC fishery under the status quo.

Alternative B3, in combination with the preferred alternative F2, would not affect the economics impacts of the smooth dogfish fishery. Smooth dogfish are primarily caught from North Carolina north. The average total landings/year are 950,859 lb dw/year (by state and federally permitted fishermen reporting to the ACCSP, however, since fishermen do not have to currently report smooth dogfish landings, this could be an underestimate of total landings, and thus, an underestimate of average annual gross revenues for this fishery), which translates into average annual gross revenues of \$371,786 lb dw/year from smooth dogfish landings. Given smooth dogfish are not typically landed with gillnet gear from South Carolina south, it is anticipated that this alternative, in combination with the preferred alternative F2, would not cause any loss in average annual gross revenues from smooth dogfish landings.

#### ***6.4.1.3 Pelagic Shark Effort Controls***

Currently, on average, 72.5 mt dw of shortfin mako sharks were commercially landed between 2004 and 2007. Based on the median real dollar, ex-vessel price per pound of \$1.59 for meat and \$12.00 for fins, for shortfin mako sharks during the same timeframe, this is equivalent to \$350,039 in annual revenues. Because the No Action Alternative, alternative C1, would not modify or alter commercial fishing practices for shortfin mako sharks or other shark species, it would likely not result in any adverse economic impacts.

Alternative C2 would implement a species-specific quota for shortfin mako at the level of the average annual commercial landings for this species. This alternative is expected to have neutral or slightly negative socio-economic impacts. On average, 72.5 mt dw (159,834 lb dw) of shortfin mako sharks were commercially landed between 2004 and 2007. Based on the median real dollar, ex-vessel price per pound of \$1.59 for shortfin mako shark meat, multiplied by the average shortfin mako landings from 2004-2007 (159,834 lb dw), this is equivalent to \$254,135 in annual revenues. Fin weight was calculated by using the standard fin to carcass ratio of 5 percent dressed weight. Using this ratio, of the 159,834 lb dw of shortfin mako, approximately 7,992 lb dw would have been shortfin mako shark fins. The fin weight was then multiplied by the median fin price per pound from 2004 to 2007 (\$12.00) to generate estimated annual economic revenues from the fins of shortfin mako sharks of \$95,904. Therefore, the estimated

annual revenues for both the meat and fins of shortfin mako shark landings from 2004-2007 is equal to approximately \$350,039. While fishermen would be able to maintain current fishing effort under this alternative, any increase in effort would be restricted by the species-specific quota of 72.5 mt dw. Under the No Action alternative, commercial fishermen currently have a 488 mt dw quota which could potentially be filled entirely by shortfin mako landings. Based on the median real dollar, ex-vessel price per pound of \$1.59 for shortfin mako sharks, a quota of 488 mt dw could result in maximum annual gross revenues equal to \$1,710,593. Thus, if the quota is reduced to 72.5 mt dw, which equals \$254,135 in ex-vessel annual gross revenues, this could potentially result in a loss of annual gross revenues of \$1,456,458 for commercial fishermen; however, given shortfin mako sharks are caught incidentally in the PLL fishery, it is unlikely that the entire pelagic shark quota would be entirely filled with shortfin mako landings. NMFS does not prefer this alternative at this time because the United States contributes a small portion of shortfin mako shark mortality due to the lack of a directed fishery compared to other foreign nations, including contracting parties to ICCAT. The 2008 ICCAT stock assessment did not recommend a TAC that was necessary for ending overfishing of shortfin mako sharks, and no international fishery management organization in which the United States participates, including ICCAT, has set a species-specific quota for shortfin mako sharks.

Alternative C3 would remove shortfin mako sharks from the pelagic shark species complex and add them to the prohibited species list. This alternative is expected to have only slightly negative economic impacts for commercial fishermen because it is not a species that is targeted by commercial fishermen. Shortfin mako sharks are predominately caught incidentally in the PLL fishery, and on average, the commercial landings for shortfin mako sharks from 2004 to 2007 were 72.5 mt dw. Based on the median real dollar, ex-vessel prices per pound of \$1.59, this is equivalent to \$254,135 in annual gross revenues. However, since shortfin mako sharks would be placed on the prohibited species list under alternative C3, there could be an estimated reduction in annual gross revenues of \$254,135 to commercial fishermen. In addition, this alternative could lead to increased operation time if commercial fishermen have to release and discard all shortfin mako sharks that are caught on PLL gear. In addition, if the commercial PLL fleet expands in the future, placing shortfin mako sharks on the prohibited species list could result in a loss of future revenues for the commercial PLL fishery.

Potential economic impacts of implementing alternatives C4a or C4b were assessed by estimating the annual mt dw of shortfin mako sharks that would normally be landed for sale, which would have to be released under these alternatives. The size limits in alternatives C4a and C4b would restrict the harvest of smaller shortfin mako sharks. To assess the impact of the size limits, NMFS calculated the average dressed weight percentage of shortfin mako sharks retained below each size limit using POP data and then applied to landings data from the 2008 SAFE Report. Because the POP data is recorded as number of individuals caught, the data needed to be converted into dressed weight. This was accomplished by utilizing records of shortfin mako sharks that were recorded as kept and had an associated length measurement in the POP data. Fork

lengths were converted into pounds dressed weight, and each conversion was multiplied by the number of sharks kept at each fork length. The dressed weights of individual sharks were then summed to get a total dressed weight for all shortfin mako sharks kept in the PLL and BLL fisheries (*i.e.*, 184,803.1 lb dw).

For alternative C4a, the summed dressed weight of all kept shortfin mako sharks under the 32 in. IDL size limit was 2,550.5 lb dw. This made up 1.4 percent of total dressed weight landings of shortfin mako sharks ( $(2,550.5 / 184,803.1) * 100$ ). This percentage was then applied to the average commercial landings found in the 2008 SAFE Report from 2004-2007 (*i.e.*, 158,884.8 lb dw) to determine the estimated dressed weight of shortfin mako sharks that would be unavailable for landing under alternative C4a ( $158,884.8 \text{ lb dw} * 1.4 \text{ percent} = 2,061.1 \text{ lb dw}$ ) (Table 6.17). The 2,061.1 lb dw of unavailable shortfin mako shark meat was then multiplied by the median price per pound estimate (\$1.59) for shortfin mako sharks from 2004 to 2007 to generate an estimated annual economic loss of \$3,277. Fin weight was calculated by using the standard fin to carcass ratio of 5 percent dressed weight. Using this ratio, 103 lb of fins would be unavailable for harvest. The unavailable fin weight was then multiplied by the median fin price per pound from 2004 to 2007 (\$12.00) to generate an estimated annual economic loss of \$1,236 in gross revenues. Economic losses of meat and fins were then summed to calculate a total economic loss of \$4,513 in annual gross revenues under alternative C4a.

For alternative C4b, the summed dressed weight of all kept shortfin mako sharks under the 22 in IDL size limit was 39.7 lb dw. This made up 0.02 percent of dressed weight landings of shortfin mako sharks ( $(39.7 / 184,803.1) * 100$ ). This percentage was then applied to the average commercial landings found in the 2008 SAFE Report from 2004-2007 (*i.e.*, 158,884.8 lb dw) to determine the estimated dressed weight of shortfin mako sharks that would be unavailable for landing under alternative C4b ( $158,884.8 \text{ lb dw} * 0.02 \text{ percent} = 34.3 \text{ lb dw}$ ) (Table 6.17). The 34.3 lb dw of unavailable shortfin mako shark was then multiplied by the median price per pound estimate (\$1.59) for shortfin mako sharks from 2004 to 2007 to generate an estimated annual economic loss of \$55 in annual gross revenues. Fin weight was calculated by using the standard fin to carcass ratio of 5 percent dressed weight. Using this ratio, 1.72 lb of fins would be unavailable for harvest. The unavailable fin weight was then multiplied by the median fin price per pound from 2004 to 2007 (\$12.00) to generate an estimated annual economic loss of \$20.64 in gross revenues. Economic losses of meat and fins were then summed to calculate a total economic loss of \$75 in annual gross revenues under alternative C4b.

**Table 6.17** Estimates of shortfin mako shark landings (lb dw) reductions according to size restrictions in alternatives C4a and C4b.

Alternative	Size Limit (inches IDL)	Average shortfin mako shark commercial landings (lb dw) from 2004-2007 (2008 Safe Report)	Percentage of total landings (lb dw) of shortfin mako sharks below size limit (POP)	Estimated total weight (lb dw) of shortfin mako shark prohibited.
C4a	32	159,884.75	1.4	2,061.1
C4b	22	159,884.75	0.02	34.3

Alternatives C4a and C4b would have minor economic impacts because only a small percentage of commercial landings would be affected by the size restrictions. Of the two alternatives, the negative economic impact of C4a would be greater, as commercial landings by weight are 2,026.8 lb dw greater than in alternative C4b. Despite these minor economic impacts, since the size limits would not reduce fishing mortality of shortfin mako sharks in the commercial sector, NMFS does not prefer this alternative at this time.

Under alternative C5, the preferred alternative, NMFS would take action at the international level through international fisheries management organizations to develop management measures applicable to all participating nations to end overfishing of shortfin mako sharks. In the short term, this alternative would not result in any negative economic impacts on commercial fishermen as it would not restrict commercial harvest of shortfin mako sharks, nor alter the pelagic shark quota. Therefore, the economic impacts of alternative C5 would be the same as described in the No Action alternative, alternative C1. However, although this alternative could have negative economic impacts in the long term if management measures were adopted by the United States that would reduce landings domestically for shortfin mako sharks. Those recommendations would ultimately help end overfishing of shortfin mako in the long term.

Alternative C6, the preferred alternative, would promote the release of shortfin mako sharks brought to fishing vessels alive. This alternative would likely not result in any negative economic or social impacts as it does not restrict commercial harvest of shortfin mako sharks that are alive at haulback, and quotas and retention limits would remain as described in the No Action alternative, Alternative C1. However, as this alternative could result in the reduction of fishing mortality of shortfin mako sharks by encouraging fishermen to release shortfin mako sharks brought to the fishing vessel alive, NMFS prefer this alternative at this time.

## **6.4.2 Recreational Measures**

### **6.4.2.1 Small Coastal Sharks**

Under alternative D1, the preferred alternative, NMFS would maintain the current recreational management measures, including the current retention limits and size limits

for SCS. Therefore, the economic impacts of alternative D1 would be the same as the status quo, and no negative social or economic impacts would be anticipated under alternative D1.

Alternative D2 would modify the minimum recreational size for blacknose sharks based on the biology of blacknose sharks. This would lower the current size limit from 54 inches FL to 36 inches FL, the size at which 50 percent of the female blacknose sharks reach sexual maturity. This could increase the landings of recreationally harvested blacknose sharks and, therefore, have positive economic impacts for recreational fishermen. Since this alternative could result in the increase of blacknose shark recreational landings, and NMFS needs to reduce the number of blacknose shark landings in order to rebuild the stock, NMFS does not prefer this alternative at this time.

Alternative D3 would increase the retention limit for Atlantic sharpnose sharks based on their current catches and stock status. Any increase in the retention limit for Atlantic sharpnose sharks would provide positive economic impacts for recreational fishermen, especially if this resulted in more charter trips for charter/headboats. However, since the latest stock assessment suggests that increased fishing efforts could result in an overfished status and/or cause overfishing to occur in the future (NMFS, 2007), NMFS does not prefer this alternative at this time.

Under alternative D4, NMFS would prohibit the retention of blacknose sharks in the recreational fishery. While recreational fishermen could still catch blacknose sharks, they would not be permitted to retain blacknose sharks and would have to release them. This could have negative economic impacts on recreational fishermen, including tournaments and charter/headboats if the prohibition of blacknose sharks resulted in fewer charters. However, since blacknose sharks are not one of the primary species targeted by recreational anglers, in tournaments, or on charters, NMFS does not anticipate large negative economic impacts from this alternative on recreational anglers, tournaments, or in the charter/headboat sector.

#### ***6.4.2.2 Pelagic Sharks***

Alternative E1 would likely not result in any adverse economic or social impacts as the No Action alternative would not substantially modify or alter recreational fishing practices for shortfin mako sharks or other shark species.

Alternative E2a would have the most severe economic impacts, as almost all of the reported shortfin mako sharks landed (99.5 percent) were smaller than the 108 inch FL size limit and would have to be released. This alternative would basically create a catch-and-release fishery for shortfin mako sharks. The impacts of alternative E2b would be less severe than alternative E2a, but would result in a 60.3 percent overall reduction in recreational shortfin mako shark landings. Under this alternative, economic impacts would be greater on the non-tournament recreational mako shark fishery, as 81 percent of those landings would fall below the 73 inch FL size limit. The percentage of recreational landings during tournaments that would be released under alternative E2b would be less

than the non-tournament recreational landings (51.7 percent to 81 percent, respectively). According to LPS data, 41 percent of shortfin mako sharks caught are kept (Table 6.18); therefore the size limit in alternatives E2 may have a substantial economic impact on the recreational fishery.

**Table 6.18 Total number of shortfin mako sharks reported to the LPS from 2004 to 2008.**

Year	Kept	Released Alive	Discard Dead	Total
2004	4640	6731	17	11389
2005	2732	3086	7	5825
2006	3639	5485	0	9123
2007	2283	3363	0	5647
2008	2348	3524	0	5872
Total	15643	22189	24	37856
Average	3129	4438	5	7571
% of Average	41%	59%	0%	100%

Under alternative E3, NMFS would establish a foundation through international fisheries management organizations, such as ICCAT to end overfishing of shortfin mako sharks. This alternative would not result in any changes in the current recreational regulations regarding bag or size limits for shortfin mako sharks. Therefore, this alternative would likely not result in any negative social or economic impacts for recreational fishermen compared to the No Action alternative, alternative E1.

Under alternative E4, NMFS would promote the live release of shortfin mako sharks in the recreational shark fishery, but this alternative would not result in any changes in the current recreational regulations regarding bag or size limits for shortfin mako sharks. Therefore, this alternative would likely not result in any negative social or economic impacts compared to the No Action alternative, alternative E1.

Under alternative E5, NMFS would remove shortfin mako sharks from the authorized species list and add them to the prohibited species list. Placing shortfin mako sharks on the prohibited species list would essentially make it a recreational catch and release fishery for this species. According to recreational landings data, on average 3,682 shortfin mako sharks were landed from 2004 to 2007 (NMFS, 2008). Although a small number of shortfin mako sharks were landed in the recreational fishery during this time period, it is also an important fishing tournament species. Fishing tournaments are an important component of HMS recreational fisheries. In 2007, there were 42 shark tournaments throughout the U.S. Atlantic Coast, including the Gulf of Mexico and the Caribbean Sea. Therefore, adding this species to the prohibited species list could lead to negative socioeconomic impacts for fishermen who participate in recreational shark tournaments that would no longer be able to retain this species during recreational fishing or tournaments.

### **6.4.3 Smooth Dogfish**

While data regarding stock status and participants in the fishery is sparse, a number of sources exist that summarize any reports of smooth dogfish catches. These

sources, particularly the ACCSP for commercial catches and the MRFSS for recreational catches, offer insight into current state of the fishery. A third source, NMFS' Science and Technology's (S&T) Annual Commercial Landings Statistics, available on the S&T webpage, is also available, however this system only contains non-confidential landings data and does not report any confidential numbers. For this reason, ACCSP data was used instead of S&T data for analysis.

Alternative F1 would likely not have any new social or economic impacts beyond the status quo, as no action would be taken. However, applying the No Action alternative would preclude gathering fishery participant information, which could result in large unknown economic and social impacts in the future if drastic measures are necessary. Thus, if fishing effort is too high for the stock, catches could decrease in the long-term, resulting in lost revenues and direct, minor adverse socioeconomic impacts on fishermen. Similarly, in the short-term, there are no indirect socioeconomic impacts expected for dealers and fish processors compared to the status quo as the fishery would continue to operate as it has been. However, in the long-term, if fishing effort on the stock is not sustainable, then decreased catches and reduced shark product could translate into decreased revenues for shark dealers, processors, and other entities that deal with shark product. These decreased revenues would result in indirect, minor adverse socioeconomic impacts on dealers and other businesses that rely on shark product.

Implementing federal management of smooth dogfish through alternative F2 would focus on characterizing the fishery and would not actively change catch levels or rates. Alternative F2 would require federal commercial and recreational fishing permits as well as require fishermen to land smooth dogfish with all of their fins naturally attached. These changes could result in short-term, direct significant adverse socioeconomic impacts on fishermen who are used to processing smooth dogfish at sea. Fishermen would also have to purchase an open access smooth dogfish commercial fishing permit or HMS Angling or CHB permit and dealers would be required to report smooth dogfish on HMS dealer reports or through the Standard Atlantic Fisheries Information System (SAFIS). Based on the life history of this species and the fact that most recreational fisherman are shore-based, the recreational smooth dogfish fishery is likely concentrated in state waters, and would not require a federal HMS Angling permit. Of those that fish in federal waters, the nominal fee of \$20.00 for a recreational HMS Angling category or CHB permit is not expected to create an impediment to entering or remaining in the recreational fishery. However, if the federal permitting system creates enough of an inconvenience as to prevent some participants from remaining in the fishery, negative social and economic impacts could result. Permitted smooth dogfish fishermen would be eligible for observer coverage selection which could result in negative social and economic impacts due to increased cost and burden. An estimate of 223 vessels would require a smooth dogfish permit; however, as fishermen are currently not required to have a permit to retain smooth dogfish, this could be an underestimate of the number of fishermen that would require a federal commercial permit for smooth dogfish in the future. NMFS would delay the implementation of these requirements until the start of the 2012 fishing season to allow time for fishermen to adjust to the changes and to allow time for the development of a new commercial smooth dogfish permit.

Thus, in the short-term, alternative F2 would result in significant but mitigated to be less than significant socioeconomic impacts due to the delay in implementation of these requirements. Once fishermen adjust to the new measures, NMFS anticipates that there would be no direct socioeconomic impacts to fishermen in the long-term.

Based on MRFSS data from 2004 to 2007, an average of 58,161 smooth dogfish were retained per year in the recreational fishery. This number is a proxy for the upper limit of participants in the federal recreational fishery that catches this species, but is likely lower because a single fisherman may have caught multiple smooth dogfish, and based on the life history of this species and the fact the most recreational fisherman are shore-based, most smooth dogfish are likely caught in state waters, which would not require a federal HMS Angling category permit. Of those that fish in federal waters, the nominal fee of \$20.00 for a recreational HMS Angling category permit is not expected to create an impediment to entering or remaining in the recreational fishery.

Based on ACCSP data from 1998-2007, in the commercial fishery, an average of 950,859 lb dw of smooth dogfish were retained per year. Of this, 47,543 lb dw of fins would be available for sale (5 percent of dw for shark fins). Using the median ex-vessel price of these products between 2004 and 2007 (\$0.29 for smooth dogfish meat and \$2.02 for smooth dogfish fins), the fishery averaged \$371,786 in revenue per year.

NMFS received numerous comments stating that the fins-attached requirement in the smooth dogfish fishery would significantly alter the fishery, and potentially result in the cessation of the fishery in federal waters. As stated above, NMFS' intention under this alternative is to minimize changes in the catch levels and catch rates, to the extent practicable, in order to collect information about the fishery. However, the practices currently employed in the smooth dogfish fishery are sometimes in conflict with other shark management measures currently in place in the Atlantic, such as the requirement to land all sharks with fins naturally attached through offloading. These practices include removing fins from the smooth dogfish, and in some cases, removing the skin and fully processing the shark while on board the vessel. NMFS recognizes fishermen's concerns that requiring fins remain naturally attached is a significant change for the fishery and could result in significant changes in how the fishery operates, including the potential cessation of fishing for smooth dogfish in federal waters. However, requiring smooth dogfish fins to remain naturally attached to the carcass is necessary for several reasons: to maintain consistency with other domestic shark regulations that require the fins remain attached while keeping the carcass essentially whole; to maintain consistency with the United States' international shark conservation and management positions; and to facilitate enforcement and species identification, as the dressed carcass and detached fins of a smooth dogfish could be misidentified as a dressed carcass or detached fins of a SCS, juvenile LCS, or spiny dogfish. Identifying all sharks to the correct species is a vital step in logbook and dealer reporting and enforcement of the regulations. These reports are used to monitor catch levels in relation to quotas and to advise stock assessments.

Currently, participants in the smooth dogfish fishery fully process the fish into “logs” or fillets of meat. Identifying the species of fully processed carcasses from cuts of meat is very difficult and may require DNA analysis. For this reason, for a number of years before requiring fins be attached, NMFS prohibited the filleting of sharks at sea and required all sharks be landed as logs. Over many years, NMFS has worked to clarify this regulation and ensure shark fishermen were aware of it. In the 2006 Consolidated HMS FMP, NMFS took a further step of requiring the second dorsal and anal fin be maintained on the dressed carcass. Furthermore, the ability to identify both carcasses and fins to the species level is essential to enforcing the prohibition on shark finning. The most effective way for fishermen, dealers, and enforcement to properly identify both fins and carcasses is to require fins remain naturally attached through offloading. Detached smooth dogfish fins can be difficult for most people to differentiate from some other shark fins. Differentiating numerous detached smooth dogfish fins from other shark fins can be inefficient and often difficult from a practical enforcement perspective, particularly in a high volume fishery such as the smooth dogfish fishery. Since July 2008, all sharks currently managed in the Consolidated HMS FMP that can be landed (e.g., large coastal sharks, small coastal sharks, and pelagic sharks) must be landed with fins naturally attached. Deviating from this measure in the smooth dogfish fishery would introduce management inconsistencies and potential enforcement loopholes. To the extent that requiring fins remain attached aids enforcement in correctly identifying sharks more quickly, there could be some minor benefits to fishermen whose vessels were boarded as they would be able to return to fishing or offloading their fish in a more timely manner.

The fins naturally-attached regulation is also consistent with the U.S. international position on shark conservation and management. Globally, shark finning is a serious threat to many shark species. The United States has co-sponsored fins attached proposals in international fora and supported an international ban on the practice of shark finning and has recently proposed adding several species to the CITES Appendix II listing to aid in monitoring the shark fin trade. An effective method to enforce this ban, particularly in areas lacking enforcement resources, is to require fins remain naturally attached to the shark carcass through offloading. In addition to this requirement, the United States also encourages maintaining the five percent fins to carcass ratio. The five percent fin to carcass ration is a critical tool for dockside enforcement when enforcement officers are unable to monitor an entire offload, and enhances shark conservation efforts by allowing NOAA to utilize dealer landing records to detect potential shark finning violations post-landing for subsequent follow-up investigation. If domestic exemptions to the fins naturally attached regulation were implemented, it could undermine the United States’ international position on the fins naturally attached policy and other shark conservation and management measures.

NMFS’ requirement to land smooth dogfish with fins naturally attached would not prohibit at-sea processing methods currently in place in most other Atlantic shark fisheries that maximize meat quality, freshness, and processing efficiencies. It would remain legal to remove the shark’s head and viscera for proper bleeding. To reduce dock-side processing needs, all fins can be partially cut at the base and only left attached

via a small flap of skin. NMFS intends to delay the effective date of the requirement until 2012 to allow fishermen and dealers time to adjust to the new requirement. Smooth dogfish management measures would not be implemented until the 2011 fishing season, and NMFS believes that the methods and techniques employed in other shark fisheries can be adopted in the interim.

As noted in the previous section, the proposed EFH for smooth dogfish would not have any social or economic impacts. The designation satisfies a statutory requirement, and no management measures are associated with its designation.

Social impacts resulting from alternative F2 and the associated sub-alternatives primarily relate to perceptions and attitudes regarding the current state of the fishery. Anecdotal evidence suggests that smooth dogfish are often considered an incidental catch and are only rarely targeted. A large portion of the catch enters the commercial market, but some are retained only for bait in other fisheries. Due to the lack of reporting requirements, NMFS is unsure of the extent of these different uses. Furthermore, smooth dogfish are considered by some to be a nuisance species, sometimes interrupting more desirable commercial and recreational fisheries. Attitudes and perceptions such as these, to the extent they exist, could confound management actions if participants in the fishery do not see the need to manage a bycatch, bait, or nuisance species. Establishing federal management could alter these attitudes and change the low perception of the species. This change in perception would likely have neutral impacts except in the case of participants using smooth dogfish as bait. In this case, participants may feel the requirements associated with federal level management are unnecessary and hinder the use of the species as an inexpensive source of bait. This could lead to negative social impacts as the current fishery changes from having minimal federal interference to requiring management measures such as the purchase of a federal smooth dogfish permit

Alternatives F2 a1, which would establish a smooth dogfish quota that is equal to the average annual landings from 1998-2007, and F2 a2, which would establish a smooth dogfish quota equal to the maximum annual landing between 1998-2007, could potentially have negative economic impacts on fishermen if the associated quotas reflect significant underreporting. If the actual landings are higher than these two quotas, fishermen would be prevented from fishing at status quo levels, which could result in lost revenues. As the quota is slightly lower under F2a1, this could result in a long-term, direct moderate adverse socioeconomic impact compared to F2a2, which is a slightly higher quota and slightly higher revenues associated it. F2a2 could result in long-term, direct, minor socioeconomic impacts. Indirectly, shark dealers and processors may experience minor adverse socioeconomic impacts in the short- and long-term if the fishery is underreported and the quotas proposed under F2a1 and F2a2 do not accurately characterize current catch level of smooth dogfish. As such, these quotas would result in a short- and long-term loss in smooth dogfish revenues.

Alternative F2a3, which would establish a smooth dogfish quota above the maximum annual landings between 1998-2007, would have neutral to negative economic impacts. The quota of maximum historical annual landings plus one standard deviation

between the years 1998 and 2007 could allow a buffer for potential unreported landings during that time. However, if the quota under this alternative did not accurately capture historical landings, then fishermen could be losing smooth dogfish revenues over the long-term, which could result in direct, minor adverse socioeconomic impacts. Indirectly, shark dealers and processors may experience minor adverse socioeconomic impacts in the short- and long-term if the smooth dogfish landings are underreported and the quota proposed under F2a3 does not accurately characterize current catch level of smooth dogfish. Based on public comment, as detailed above, NMFS does not believe that this alternative would adequately account for underreporting.

Alternative F2a4, the preferred alternative, would establish a smooth dogfish quota above the maximum annual landings between 1998-2007 and would have neutral economic impacts. The quota of maximum historical annual landings plus two standard deviations between the years 1998 and 2007 would allow a buffer for potential unreported landings during that time. This would allow the fishery to continue at the current rate and level into the future without having to be shut down prematurely. Given the fishery would expect to operate as it currently does, NMFS does not anticipate any indirect impacts in the short- or long-term for shark dealers and processors.

There are no negative economic impacts anticipated with alternative F2 b1. There is no charge associated with fishermen and researchers obtaining an EFP, SRP, display permit, or LOA for research or the collection for public display. In addition, NMFS would establish a smooth dogfish set-aside that would accommodate current and future research activities. Thus, NMFS does not anticipate any negative economic impacts associated with alternative F2 b1.

As with alternative F2 b1, there are no negative economic impacts anticipated with alternative F2 b2. There is no charge associated with fishermen and researchers obtaining an EFP, SRP, display permit, or LOA for research or for the collection for public display. In addition, NMFS would establish a smooth dogfish set-aside that would accommodate current and future research activities. Thus, NMFS does not anticipate any negative economic impacts associated with alternative F2 b1.

Alternative F3, which would implement management measures for smooth dogfish that complement the ASMFC plan, would likely have neutral to slightly positive socio-economic impacts. Most of the ASMFC regulations would not change the smooth dogfish fishery as it currently operates, fishermen would be required to leave the dorsal fin on the smooth dogfish through landing from July through February, which could change how the fishery operates, and therefore, have direct minor, adverse socioeconomic impacts in the short-term. The extent of these impacts will depend on how many smooth dogfish are landed between July and February of each year. Because this requirement began in state waters in January 2010, it could mitigate some of the socioeconomic impacts associated with alternative F2 with regard to the requirement of having all fins naturally attached under the federal plan. Thus, by the start of the fishing season in 2012, fishermen who have been fishing in state waters should have a better idea of how to keep all fins naturally attached.

In the long-term, since no quota is being established under alternative F3, if fishing effort is too high for the stock, catches could decrease in the long-term, resulting in lost revenues and direct, minor adverse socioeconomic impacts on fishermen. Indirectly, in the short-term there are no indirect socioeconomic impacts expected for dealers and fish processors compared to the status quo as the fishery would continue to operate as it has been with the exception of the requirement to leave the dorsal fin on from July through February. However, if the requirement to have the dorsal fin attached during certain times of the year affects how dealers and processors process smooth dogfish, then there could be indirect, minor adverse socioeconomic impacts on smooth dogfish dealers until they learn how to process these sharks during July through February. In the long-term, if fishing effort on the stock is not sustainable, then decreased catches and reduced smooth dogfish product could translate into decreased revenues for shark dealers, processors, and other entities that deal with smooth dogfish product. This would result in indirect, minor adverse socioeconomic impacts on dealers and other businesses that rely on smooth dogfish. Additional social impacts resulting from alternative F3 are likely the same as those described for alternative F2.

## **Chapter 6 References**

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## CHAPTER 7 TABLE OF CONTENTS

<b>Chapter 7 Table of Contents</b> .....	<b>7-i</b>
<b>Chapter 7 List of Tables</b> .....	<b>7-ii</b>
<b>7.0 Regulatory Impact Review</b> .....	<b>7-1</b>
7.1 Description of the Management Objectives.....	7-1
7.2 Description of the Fishery.....	7-2
7.3 Statement of the Problem.....	7-2
7.4 Description of Each Alternative .....	7-2
7.5 Economic Analysis of Expected Effects of Each Alternative Relative to the Baseline ... .....	7-3
7.6 Conclusions.....	7-15

## CHAPTER 7 LIST OF TABLES

Table 7.1	Net Economic Benefits and Costs of Alternatives.....	7-3
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## **7.0 REGULATORY IMPACT REVIEW**

The Regulatory Impact Review (RIR) is conducted to comply with Executive Order 12866 (E.O. 12866) and provides analyses of the economic benefits and costs of each alternative to the fishery and nation as a whole. Certain elements required in an RIR are also required as part of this environmental impact statement (EIS). This RIR builds upon the data and analysis presented in the following sections of the FEIS: Chapter 1 (purpose and need for action), Chapter 2 (alternative regulatory options to meet the purpose and need), Chapter 3 (description of the affected regulated community), Chapters 4 (economic consequences of amendment and implementing regulations), 6 (extensive discussion of economic impacts of alternative approaches) and Chapter 8 (the final regulatory impact analysis).. The information contained in Section 7.0, taken together with the foregoing data and analysis incorporated by reference, comprise the complete RIR.

The requirements for all regulatory actions specified in EO 12866 are summarized in the following statement from the order:

*In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits should be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nonetheless essential to consider. Further, in choosing among alternative regulatory approaches, agencies should select those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.*

E.O. 12866 further requires Office of Management and Budget review of proposed regulations that are considered to be “significant.” A significant regulatory action is one that is likely to:

- Have an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, local or tribal governments of communities;
- Create serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
- Raise novel legal or policy issues arising out of legal mandates, the president’s priorities, or the principles set forth in this Executive Order.

### **7.1 Description of the Management Objectives**

Please see Chapter 1 for a full description of the purpose and need for the proposed amendments to the 2006 Consolidated HMS FMP and implementing regulations including proposed fishery management actions. The management goals and objectives of the proposed alternative management measures are to provide for the sustainable management of shark species

under authority of the Secretary consistent with the requirements of the Magnuson-Stevens Act and other statutes which may apply to such management, including the ESA, MMPA and ATCA. The primary mandate of the Magnuson-Stevens Act is for the Secretary to provide for the conservation and management of HMS through development of an FMP for species identified for management and to implement the FMP with necessary regulations. In addition, the Magnuson-Stevens Act directs the Secretary, in managing HMS, to prevent overfishing of species while providing for their OY on a continuing basis and to rebuild fish stocks that are considered overfished. The management objectives of the preferred management measures are to amend the 2006 Consolidated HMS FMP to ensure that overfishing of both the blacknose shark and short fin mako is ended, the blacknose shark stock is rebuilt, and smooth dogfish is brought under the management jurisdiction of the Secretary.

## **7.2 Description of the Fishery**

Please see Chapter 3 for a description of the fisheries that could be affected by these management actions.

## **7.3 Statement of the Problem**

Please see Chapter 1 for a description of a full discussion of the purpose and need for these management actions which is in essence a statement of the problem to be addressed by the amendment and implementing regulations. The preferred management measures are designed to address the following problems. The blacknose shark has been determined to be in an overfished condition with overfishing occurring. The Secretary, in his capacity as the official responsible for managing HMS, is legally responsible for taking action to end overfishing of the stock and rebuild it. The shortfin mako shark has been determined to be subject to overfishing and is approaching an overfished condition. The Secretary has a similar legal responsibility to take action to end and prevent overfishing of the stock. Smooth dogfish is not presently under federal management. The Secretary has authority and responsibility to manage highly migratory species including oceanic sharks and has determined that smooth dogfish, a highly migratory oceanic shark, is in need of federal conservation and management. The Secretary, thus, has a statutory responsibility to exercise the authority and responsibility to include the species under NMFS management. NMFS has determined that these problems, collectively, cannot be addressed in the absence of an amendment to the HMS FMP which, as a matter of necessity, must be implemented by regulation.

## **7.4 Description of Each Alternative**

Please see Chapter 2 for a summary of each alternative, Chapter 3 for a complete description of the affected fisheries, and Chapter 4 for a complete description of each alternative and its expected ecological, social, and economic impacts on the regulated community. Chapters 6 and 8 provide additional information related to the economic impacts of the alternatives.

## 7.5 Economic Analysis of Expected Effects of Each Alternative Relative to the Baseline

**Table 7.1 Net Economic Benefits and Costs of Alternatives**

<b>Alternatives</b>	<b>Net Economic Benefits</b>	<b>Net Economic Costs</b>
Alternative A1 No Action. Maintain the existing SCS quota and species complex	This alternative would maintain current economic activity associated with SCS landing levels in the short term.	In the long term, there could be economic costs associated with continued overfishing of blacknose sharks, including population decline and associated reduced revenues from landings.
Alternative A2 Establish a new SCS quota of 221.6 mt dw and a blacknose quota of 12.1 mt dw	<p>There would be unquantified benefits to the public associated with reducing the commercial landings of blacknose sharks. These benefits include passive use values, such as shark viewing trips, and nonuse values including knowing that shark species remain for future generations (bequest value) and values placed on knowing shark species will continue to survive (existence value). However, there would be neutral economic benefits for the non-blacknose SCS fishermen because the quota is equal to the current average landings.</p> <p>Long-term, the blacknose shark stock could rebuild. Then SCS and blacknose quotas could be increased to sustainable levels and allow for increased harvests and associated revenues.</p>	<p>There would be an estimated decrease in annual gross revenues of \$138,499 from the commercial harvest of blacknose shark.</p> <p>There would be an estimated decrease in annual gross revenues of \$43,592 from the commercial harvest of non-blacknose SCS.</p>

<b>Alternatives</b>	<b>Net Economic Benefits</b>	<b>Net Economic Costs</b>
<p>Alternative A3 Establish a new SCS quota of 110.8 mt dw and a blacknose quota of 19.9 mt dw; allow all current authorized gears for sharks</p>	<p>There would be unquantified benefits to the public associated with reducing the landings and discards of overfished blacknose sharks. These benefits include passive use values, such as shark viewing trips, and nonuse values including knowing that shark species remain for future generations (bequest value) and values placed on knowing shark species will continue to survive (existence value).</p> <p>Similar benefits could also occur as a result of reduced landings of Atlantic sharpnose, bonnethead and finetooth sharks.</p> <p>Long-term, the blacknose shark stock could rebuild. Then SCS and blacknose quotas could be increased to sustainable levels and allow for increased harvests and associated revenues.</p>	<p>There would be an estimated reduction of \$353,815 in gross revenues annually from non-blacknose SCS.</p> <p>There would be an estimated reduction of \$108,653 in gross revenues annually from blacknose sharks.</p> <p>There would be economic costs associated with the estimated 62% increase in non-blacknose SCS discards under this alternative.</p>

Alternatives	Net Economic Benefits	Net Economic Costs
<p>Alternative A4 Establish a new SCS quota of 55.4 mt dw and a blacknose quota of 15.9 mt dw; remove shark gillnet gear as an authorized gear for sharks</p>	<p>There would be unquantified benefits to the public associated with reducing the landings and discards of overfished blacknose sharks and for non-blacknose SCS. These benefits include passive use values, such as shark viewing trips, and nonuse values including knowing that shark species remain for future generations (bequest value) and values placed on knowing shark species will continue to survive (existence value).</p> <p>This alternative would result in fewer discards of non-blacknose SCS than under alternative A3, and thus reduce the ecological costs associated with dead discards and the operational costs associated with handling discards.</p> <p>Long-term, the SCS stocks could rebuild. Then SCS and blacknose quotas could be increased to sustainable levels and allow for increased harvests and associated revenues.</p>	<p>There would be an estimated reduction of \$508,926 in gross revenues annually from non-blacknose SCS.</p> <p>There would be an estimated reduction of \$118,987 in gross revenues annually from blacknose sharks.</p> <p>Vessels using gillnet gear would also face an estimated reduction in gross revenues annually from non-blacknose SCS of \$287,427 and \$90,501 from blacknose sharks in conjunction with Alternative B2. In conjunction with Alternative B3, those vessels would face an estimated reduction in gross revenues annually from non-blacknose SCS of \$275,008 and \$90,059 from blacknose sharks.</p> <p>This alternative could also reduce landings of LCS, predominately blacktip sharks, which are also caught in gillnet gear. In conjunction with Alternative B2, LCS gross revenues would be reduced by an estimated \$109,339 annually. In conjunction with Alternative B3, LCS revenues would be reduced by an estimated \$106,479 annually.</p>
<p>Alternative A5 Close the SCS fishery</p>	<p>Significant unquantified benefits to the public would like be achieved for all SCS species and there would also be some benefits from reduced LCS landings from gillnet gear. These benefits include passive use values, such as shark viewing trips, and nonuse values including knowing that shark species remain for future generations (bequest value) and values placed on knowing shark species will continue to survive (existence value).</p> <p>Long-term, the SCS stocks could rebuild. Then SCS and blacknose quotas could be increased to sustainable levels and allow for increased harvests and associated revenues.</p>	<p>This alternative would result in a loss of annual gross revenues of approximately \$664,037 for non-blacknose SCS and \$172,110 from blacknose shark landings per year for a total loss of \$830,918 in annual gross revenues from SCS landings.</p> <p>It would also be likely that directed shark gillnet fishing would end, except for fishermen that use gillnet gear to strikenet for blacktip sharks. This could decrease average annual gross revenues from LCS landings by an estimated \$107,280.</p> <p>This alternative would also severely curtail data collection on all SCS that could be used for future stock assessments.</p>

<b>Alternatives</b>	<b>Net Economic Benefits</b>	<b>Net Economic Costs</b>
<p><i>Alternative A6</i>  <i>Establish a new SCS quota of 221.6 mt dw and a blacknose quota of 19.9 mt dw; allow all current authorized gears for sharks – Preferred Alternative</i></p>	<p>There would be unquantified benefits to the public associated with reducing the landings and discards of overfished blacknose sharks and for non-blacknose SCS. These benefits include passive use values, such as shark viewing trips, and nonuse values including knowing that shark species remain for future generations (bequest value) and values placed on knowing shark species will continue to survive (existence value).</p> <p>This alternative would result in fewer discards of non-blacknose SCS than under alternative A3, and thus reduce the ecological costs associated with dead discards and the operational costs associated with handling discards.</p> <p>Long-term, the SCS stocks could rebuild. Then SCS and blacknose quotas could be increased to sustainable levels and allow for increased harvests and associated revenues.</p>	<p>There would be an estimated reduction of \$43,593 in gross revenues annually from non-blacknose SCS.</p> <p>There would be an estimated reduction of \$116,832 in gross revenues annually from blacknose sharks.</p>
<p><i>Alternative B1</i>  <i>No Action. Maintain current authorized gears for commercial shark fishing – Preferred Alternative</i></p>	<p>No change</p>	<p>No change</p>

Alternatives	Net Economic Benefits	Net Economic Costs
<p>Alternative B2 Close shark gillnet fishery; remove gillnet gear as an authorized gear type for commercial shark fishing</p>	<p>There would be unquantified benefits to the public associated with the positive impacts to SCS and LCS, and resulting from reduced commercial landings and decrease bycatch rates of both target and non-target species, including protected resources. These benefits include passive use values, such as shark viewing trips, and nonuse values including knowing that shark species remain for future generations (bequest value) and values placed on knowing shark species will continue to survive (existence value).</p>	<p>This alternative would close the shark gillnet fishery and negatively impact the business operations of vessels that utilize gillnet gear for shark fishing.</p> <p>It would reduce gross annual landings of SCS with gillnet gear by directed shark permit holders by an estimated \$365,955 per year.</p> <p>It would also reduce gross annual landings of SCS with gillnet gear by incidental shark permit holders by an estimated \$11,973 per year.</p> <p>There would be an estimated reduction of \$109,399 in average annual gross revenues from lost LCS landings.</p> <p>There would be an estimated reduction of \$371,786 in gross revenues annually from smooth dogfish landings.</p>
<p>Alternative B3 Close the gillnet fishery to commercial shark fishing from South Carolina south, including the Gulf of Mexico and Caribbean Sea</p>	<p>There would be unquantified benefits to the public associated with the positive impacts to SCS and LCS resulting from reduced commercial landings and decrease bycatch rates of both target and non-target species, including protected resources. These benefits include passive use values, such as shark viewing trips, and nonuse values including knowing that shark species remain for future generations (bequest value) and values placed on knowing shark species will continue to survive (existence value).</p>	<p>As a result of a closure of the gillnet fishery to commercial shark fishing from South Carolina south, directed shark fishermen would lose \$358,261 average annual gross revenues from lost SCS landings.</p> <p>It would also reduce gross annual landings of SCS with gillnet gear by incidental shark permit holders by an estimated \$6,807 per year.</p> <p>There would be an estimated reduction of \$106,479 in average annual gross revenues from lost LCS landings.</p>
<p>Alternative C1 No Action. Keep shortfin mako sharks in the pelagic shark species complex and maintain the quota</p>	<p>No change</p>	<p>No change</p>

Alternatives	Net Economic Benefits	Net Economic Costs
<p>Alternative C2 Remove shortfin mako sharks from pelagic shark species quota and establish a shortfin mako quota</p>	<p>Removing shortfin mako sharks from this group of pelagic sharks would allow them to be managed separately and would give NMFS the ability to track this separate quota more efficiently. This could result in more efficient management that would result in less economic impacts.</p>	<p>This alternative is expected to have neutral or slightly negative socioeconomic impacts.</p> <p>While fishermen would be able to maintain current fishing effort under this alternative, any increase in effort would be restricted by the species specific quota of 72.5 mt dw. If the quota is reduced to 72.5 mt dw, which equals \$254,135 in average annual gross revenues, this could potentially result in a loss of annual revenues of \$1,456,458 for commercial fishermen. However, as shortfin mako sharks are a bycatch species in the PLL fishery, it is unlikely that 488 mt dw of shortfin mako would be landed, and therefore, this alternative could result in neutral or slightly negative socioeconomic impacts for commercial fishermen.</p>
<p>Alternative C3 Remove shortfin mako sharks from pelagic shark species complex and place this species on the prohibited shark species list</p>	<p>Placing shortfin mako sharks on the prohibited species list would prohibit landings and help prevent further overfishing. There would be unquantified benefits to the public associated with this. These benefits include passive use values, such as shark viewing trips, and nonuse values including knowing that shark species remain for future generations (bequest value) and values placed on knowing shark species will continue to survive (existence value).</p> <p>Long-term, the shortfin mako shark stock could rebuild and then harvest could potentially resume at sustainable levels.</p>	<p>This alternative would result in an estimated reduction in average annual gross revenues of \$254,135 to the commercial fishermen.</p> <p>In addition, this alternative could lead to increased operation time if commercial fishermen have to release and discard all shortfin makos that are caught on the PLL gear.</p>
<p>Alternative C4 Establish a commercial size limit for shortfin mako sharks</p>	<p>These alternatives would result in varying degree of ecological benefits.</p>	<p>There would be minimal economic impacts, because only a small percentage of commercial landings would be affected by the size restrictions.</p>

<b>Alternatives</b>	<b>Net Economic Benefits</b>	<b>Net Economic Costs</b>
<p>Alternative C4a Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of female shortfin mako sharks reach the sexual maturity or 32 inches interdorsal length (IDL)</p>	<p>There would be an increase in the number of shortfin mako sharks released alive annually in the PLL fishery. There would be unquantified benefits to the public associated with this. These benefits include passive use values, such as shark viewing trips, and nonuse values including knowing that shark species remain for future generations (bequest value) and values placed on knowing shark species will continue to survive (existence value).</p> <p>Long-term, the shortfin mako shark stock could rebuild and then harvest could potentially resume at sustainable levels.</p>	<p>This alternative would result in an estimated reduction of \$4,513 in average annual gross revenues from shortfin mako shark landings.</p>
<p>Alternative C4b Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of male shortfin mako sharks reach the sexual maturity or 22 inches IDL</p>	<p>There would be an increase in the number of shortfin mako sharks released alive annually in the PLL fishery, but less than under Alternative C4a. There would be unquantified benefits to the public associated with this. These benefits include passive use values, such as shark viewing trips, and nonuse values including knowing that shark species remain for future generations (bequest value) and values placed on knowing shark species will continue to survive (existence value).</p> <p>Long-term, the shortfin mako shark stock could rebuild and then harvest could potentially resume at sustainable levels.</p>	<p>There would be an estimated decrease in average annual gross revenues of \$75 from the reduction in commercial harvest of shortfin mako sharks.</p>

<b>Alternatives</b>	<b>Net Economic Benefits</b>	<b>Net Economic Costs</b>
<p><i>Alternative C5</i>  <i>Take action at the international level to end overfishing of shortfin mako sharks – Preferred Alternative</i></p>	<p>While this alternative would have neutral ecological impacts for shortfin mako sharks in the short term, any management recommendations adopted at ICCAT to help protect shortfin mako sharks would be implemented domestically and could have positive ecological impacts on shortfin mako sharks in the long term. There would be unquantified benefits to the public associated with this. These benefits include passive use values, such as shark viewing trips, and nonuse values including knowing that shark species remain for future generations (bequest value) and values placed on knowing shark species will continue to survive (existence value).</p> <p>Long-term, the shortfin mako shark stock could rebuild and then harvest could potentially resume at sustainable levels.</p>	<p>In the short term, this alternative would not result in any negative economic or social impacts on commercial fishermen as it would not restrict commercial harvest of shortfin mako sharks, nor alter the pelagic shark quota.</p> <p>There could be potential economic impacts in the long-term if ICCAT develops management recommendations that are implemented domestically.</p>
<p><i>Alternative C6</i>  <i>Promote the release of shortfin mako sharks brought to fishing vessels alive – Preferred Alternative</i></p>	<p>This alternative is expected to have slightly positive or neutral ecological benefits for shortfin mako sharks because 68.9 percent of shortfin makos are brought to the vessel alive and could be released. There would be unquantified benefits to the public associated with this. These benefits include passive use values, such as shark viewing trips, and nonuse values including knowing that shark species remain for future generations (bequest value) and values placed on knowing shark species will continue to survive (existence value).</p> <p>There could also be positive economic benefits to fishermen if they are perceived as being environmentally responsible because they are voluntarily releasing a species suffering from overfishing.</p>	<p>This alternative would likely not result in any negative economic or social impacts as it does not restrict commercial harvest of shortfin mako sharks that are alive at haulback, and quotas and retention limits would remain as described under alternative C1.</p>

<b>Alternatives</b>	<b>Net Economic Benefits</b>	<b>Net Economic Costs</b>
<i>Alternative D1 No Action. Maintain the current recreational retention and size limits for SCS - Preferred Alternative</i>	No change	This alternative would not result in any negative economic impacts as it maintains the current recreational size and bag limits for blacknose sharks. This alternative would have neutral ecological impacts on blacknose sharks, as this species rarely reaches a size greater than the current federal minimum size, therefore, the 54 inch FL size limit creates a de facto retention prohibition of blacknose sharks in federal waters.
Alternative D2 Modify the minimum recreational size for blacknose sharks based on their biology	This alternative could increase the landings of recreationally harvested blacknose sharks and, therefore, have positive social and economic impacts in the short-term.	This alternative could result in the increase of blacknose shark recreational landings, and NMFS needs to reduce the number of blacknose shark landings in order to rebuild the stock.
Alternative D3 Increase the retention limit for Atlantic sharpnose sharks based on current catches	Any increase in the retention limit for Atlantic sharpnose sharks would provide positive social and economic impacts, especially if this resulted in more charter trips for charter/headboats.	Since the latest stock assessment suggests that increased fishing efforts could result in an overfished status and/or cause overfishing to occur in the future, this alternative could result in negative ecological impacts.
Alternative D4 Prohibit retention of blacknose sharks in recreational fisheries	There would be unquantified benefits to the public associated with reducing recreational landings of overfished blacknose sharks. These benefits include passive use values, such as improved catch-and-release fishing, shark viewing trips, and nonuse values including knowing that shark species remain for future generations (bequest value) and values placed on knowing shark species will continue to survive (existence value).	While recreational fishermen may still catch blacknose sharks, they would not be permitted to retain blacknose sharks and would have to release them. This could have negative social and economic impacts on recreational fishermen, including tournaments and charter/headboats if the prohibition of blacknose sharks resulted in fewer charters.  However, blacknose sharks rarely, if ever, reach the current federal minimum recreational size limit of 54 inches FL. In addition, blacknose sharks are not one of the primary species targeted by recreational anglers in tournaments or on charters. Thus, NMFS does not anticipate large negative social and economic impacts from this preferred alternative in tournaments or in the charter/headboat sector.
Alternative E1 No Action. Maintain the current recreational retention and size limits for shortfin mako sharks	No change	No change

Alternatives	Net Economic Benefits	Net Economic Costs
<p>Alternative E2a Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of female shortfin mako sharks reach sexual maturity or 108 in FL</p>	<p>This alternative would result in 65% more shortfin mako sharks released than alternative E2b. There would be unquantified benefits to the public associated with this. These benefits include passive use values, such as improved catch-and-release fishing, shark viewing trips, and nonuse values including knowing that shark species remain for future generations (bequest value) and values placed on knowing shark species will continue to survive (existence value).</p> <p>Long-term, this alternative could increase angler consumer surplus by reducing overfishing of shortfin mako sharks and allowing stocks to rebuild.</p>	<p>This alternative would have negative economic impacts on shark recreational fishing, as almost all of the reported shortfin mako sharks landed (99.5%) were smaller than the 108 inch FL size limit and would have to be released.</p>
<p>Alternative E2b Establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of male shortfin mako sharks reach sexual maturity or 73 inches FL</p>	<p>This alternative would cause a positive ecological impact for the stock. There would be unquantified benefits to the public associated with this. These benefits include passive use values, such as improved catch-and-release fishing, shark viewing trips, and nonuse values including knowing that shark species remain for future generations (bequest value) and values placed on knowing shark species will continue to survive (existence value).</p> <p>Long-term, this alternative could increase angler consumer surplus by reducing overfishing of shortfin mako sharks and allowing stocks to rebuild.</p>	<p>This alternative would have less severe impacts on recreational anglers compared to alternative E2a, but would result in a 60.3% overall reduction in recreational shortfin mako shark landings.</p> <p>Economic impacts would be greater on the non-tournament recreational mako shark fishery, as 81% of those landings would fall below the 73 inch FL size limit.</p>
<p><i>Alternative E3 Take action at the international level to end overfishing of shortfin mako sharks – Preferred Alternative</i></p>	<p>Could have positive ecological impacts on shortfin mako sharks in the long term</p>	<p>No change in the short term. There could be potential economic impacts in the long-term if ICCAT develops management recommendations that are implemented domestically.</p>

<b>Alternatives</b>	<b>Net Economic Benefits</b>	<b>Net Economic Costs</b>
<i>Alternative E4</i> <i>Promote the release of shortfin mako sharks brought to fishing vessels alive – Preferred Alternative</i>	Could have positive ecological impacts on shortfin mako sharks in the long term.	No change
Alternative E5 Prohibit retention of shortfin mako sharks in recreational fisheries (catch and release only)	This alternative would have positive ecological impacts on the stock. There would be unquantified benefits to the public associated with this. These benefits include passive use values, such as improved catch-and-release fishing, shark viewing trips, and nonuse values including knowing that shark species remain for future generations (bequest value) and values placed on knowing shark species will continue to survive (existence value).	This alternative would lead to negative socio-economic impacts for fishermen who participate in recreational shark tournaments that would no longer be able to retain this species during recreational fishing or tournaments and it would also negatively impact fishermen that desire to retain shortfin mako sharks outside of tournaments. This could also reduce the demand for CHB trips that target shortfin mako sharks.
Alternative F1 No Action. Do not add smooth dogfish under NMFS management	No change	No change
<i>Alternative F2</i> <i>Add smooth dogfish under NMFS management and establish a federal permit requirement. Preferred Alternative</i>	Improved data on fishery participation would improve future management of the fishery.	This alternative would result in some administrative costs and fees associated with completing an application for a federal smooth dogfish permit.  This alternative would require fishermen to land smooth dogfish with all of their fins naturally attached. This would have a direct significant impact on fishermen who are used to processing smooth dogfish at sea.
Alternative F2 a1 Establish a smooth dogfish quota that is equal to the average annual landings from 1998-2007 (431.1 mt dw)	Potential positive ecological benefits for smooth dogfish could result from setting the quota equal to average current landings.	This alternative could restrict the fishery given the likelihood of underreporting.  Establishing a quota equal to average current landings could reduce the revenue generated by the commercial landing of smooth dogfish if there are substantial current unreported smooth dogfish landings.

<b>Alternatives</b>	<b>Net Economic Benefits</b>	<b>Net Economic Costs</b>
Alternative F2 a2 Establish a smooth dogfish quota equal to the maximum annual landing from 1998-2007 (576.1 mt dw)	Potential positive ecological benefits for smooth dogfish could result from setting the quota equal to the maximum annual landings.	Establishing a quota equal to the maximum annual landings could reduce the revenue generated by the commercial landing of smooth dogfish if there are substantial current unreported smooth dogfish landings
Alternative F2 a3 Establish a smooth dogfish quota equal to the maximum annual landing between 1998-2007 plus one standard deviation (645.8 mt dw)	Potential positive ecological benefits for smooth dogfish could result from setting the quota to the maximum annual landings plus one standard deviation.	Establishing a quota equal to the maximum annual landings plus one standard deviation would maintain revenues generated by the commercial landing of smooth dogfish the same if there are substantial current unreported smooth dogfish landings
Alternative F2 a4 <i>Establish a smooth dogfish quota equal to the maximum annual landings from 1998-2007 plus two standard deviations (715.5 mt dw) – Preferred Alternative</i>	Potential positive ecological benefits for smooth dogfish could result from setting the quota to the maximum annual landings plus one standard deviation.	Establishing a quota equal to the maximum annual landings plus two standard deviations would maintain revenues generated by the commercial landing of smooth dogfish the same if there are substantial current unreported smooth dogfish landings.
Alternative F2 b1 <i>Establish a separate smooth dogfish set-aside quota for the exempted fishing program – Preferred Alternative</i>	No change	No change
Alternative F2 b2 Establish a smooth dogfish set-aside quota for the exempted fishing program and add it to the current 60 mt ww set-aside quota for the exempted fishing program	No change	No change
Alternative F3 Add smooth dogfish under NMFS management and mirror management measures implemented in the ASMFC Interstate Shark FMP	Potential neutral or slightly positive economic benefits as the ASMFC Interstate Shark Plan removed the net checks and allows fishermen to process the shark at sea during certain times of the year.	Because the ASMFC Interstate Shark plan would maintain the fishery similar to how it currently operates this alternative would have neutral economic benefits for the smooth dogfish fishermen.

## 7.6 Conclusions

As noted above under E.O. 12866, a regulation is a “significant regulatory action” if it is likely to: (1) have an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities; (2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; and (3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the legal mandates, the President’s priorities, or the principles set forth in the Executive Order; or, (4) raise novel legal or policy issues arising out of legal mandates, the president’s priorities, or the principles set forth in this Executive Order. The preferred alternatives described in this document do not meet the above criteria. The preferred alternatives would have an annual effect on the economy less than \$100 million and would not adversely affect the aforementioned parameters (see Table 7.1). The preferred alternatives would also not create an inconsistency or interfere with an action taken by another agency. Furthermore, the preferred alternatives would not materially alter the budgetary impact of entitlements, grants, user fees, the President’s priorities, or the principles set forth in E.O. 12866. Nor would the proposed regulations raise any unique legal or policy issues. The Secretary, through NMFS, has been managing shark species through FMPs since 1993 and from time-to-time amending plans and implementing regulations to modify management measures and add additional species for management. In addition, NMFS has participated in international efforts to develop management measures for stocks affected by multiple nations. The preferred alternative and other alternatives do not materially depart from this management approach. Therefore, under E.O. 12866, the preferred alternatives described in this document have been determined to be not significant for the purposes of E.O. 12866. The Office of Management and Budget (OMB) concurred with this determination provided in the listing memo for this proposed rule. A summary of the expected net economic benefits and costs of each alternative, which are based on supporting text in Chapters 4 and 6, can be found in Table 7.1.

In addition, based on the foregoing analysis in this Chapter and those incorporated by reference, NMFS has made the following determinations. The stated problem cannot be resolved through application of existing regulations. For example, a reduction in quota for the commercial harvest of blacknose shark is necessary to meet the statutory requirement to rebuild the stock. The reduction can only be achieved through amendment of the HMS FMP with a corresponding enforceable regulation. Existing regulations and laws do not contribute to the problem such that their amendment could more efficiently address the stated problem. NMFS considered taking no action as an alternative to regulation but determined that the problem could not be addressed in the absence of regulation given the Magnuson-Stevens Act’s multiple requirements bearing on the issue. Based on internal agency review and consideration of public comment, NMFS has developed preferred alternatives, based on the best scientific information available, to develop regulations that meet the objectives in the most cost-effective manner tailored to impose the least burden on the regulated community possible. The regulations are based on performance measures as they set objective standards rather than prescribing changes in the practices of fishermen in the shark fishery. The proposed amendment as implemented by regulation do not duplicate existing requirements and are not inconsistent with existing

regulations of NMFS or other federal agencies. NMFS has provide all stakeholders, including public agencies, private individuals, non-governmental organizations and others multiple opportunities to comment on the proposed regulations including a sixty day review period for the amendment, proposed regulations and DEIS.

**CHAPTER 8 TABLE OF CONTENTS**

**Chapter 8 Table of Contents.....8-i**

**8.0 Final Regulatory Flexibility Analysis..... 8-1**

8.1 Statement of the Need for and Objectives of this Final Rule ..... 8-1

8.2 A Summary of the Significant Issues Raised By the Public Comments in Response to the Initial Regulatory Flexibility Analysis, a Summary of the Assessment of the Agency of Such Issues, and a Statement of Any Changes Made in the Rule as a Result of Such Comments..... 8-1

8.3 Description and Estimate of the Number of Small Entities to Which the Final Rule Would Apply..... 8-4

8.4 Description of the Projected Reporting, Record-keeping, and Other Compliance Requirements of the Proposed Rule, Including an Estimate of the Classes of Small Entities Which Would Be Subject to the Requirements of the Report or Record ..... 8-6

8.5 Description of the Steps the Agency Has Taken to Minimize the Significant Economic Impact on Small Entities Consistent with the Stated Objectives of Applicable Statutes, Including a Statement of the Factual, Policy, and Legal Reasons for Selecting the Alternative Adopted in the Final Rule and the Reason That Each one of the Other Significant Alternatives to the Rule Considered by the Agency Which Affect Small Entities Was Rejected ..... 8-6

8.5.1 Commercial Measures ..... 8-8

8.5.2 Recreational Measures ..... 8-20

8.5.3 Smooth Dogfish ..... 8-22

**Chapter 8 References.....8-25**



## **8.0 FINAL REGULATORY FLEXIBILITY ANALYSIS**

The Final Regulatory Flexibility Analysis (FRFA) is conducted to comply with the Regulatory Flexibility Act (5 USC 601 et. seq.) (RFA). The goal of the RFA is to minimize the economic burden of federal regulations on small entities. To that end, the RFA directs federal agencies to assess whether the proposed regulation is likely to result in significant economic impacts to a substantial number of small entities, and identify and analyze any significant alternatives to the proposed rule that accomplish the objectives of applicable statutes and minimize any significant effects on small entities. Certain data and analysis required in a FRFA are also included in other chapters of this FEIS. They include: Chapter 1 (purpose and need for action), Chapter 2 (alternative regulatory options to meet the purpose and need), Chapter 3 (description of the affected regulated community), Chapters 4 (economic consequences of amendment and implementing regulations), 6 (extensive discussion of economic impacts of alternative approaches) and Chapter 7 (Regulatory Impact Review). Therefore, the FRFA incorporates the economic impacts identified in the FEIS by reference as supporting data for this analysis.

### **8.1 Statement of the Need for and Objectives of this Final Rule**

Please see Chapter 1 for a full description of the objective of the proposed rule amendments to the 2006 Consolidated HMS FMP and implementing regulations including proposed fishery management actions. The management goals and objectives of the preferred management measures are to provide for the sustainable management of shark species under authority of the Secretary consistent with the requirements of the Magnuson-Stevens Act and other statutes which may apply to such management, including the ESA, MMPA and ATCA. The primary mandate of the Magnuson-Stevens Act is for the Secretary to provide for the conservation and management of HMS through development of an FMP for species identified for management and to implement the FMP with necessary regulations. In addition, the Magnuson-Stevens Act directs the Secretary, in managing HMS to prevent overfishing of species while providing for their OY on a continuing basis and to rebuild fish stocks that are considered overfished. The management objectives of the preferred management measures are to amend the 2006 Consolidated HMS FMP to ensure that overfishing of both the blacknose shark and short fin mako is ended, the blacknose shark stock is rebuilt, and smooth dogfish is brought under the management jurisdiction of the Secretary.

### **8.2 A Summary of the Significant Issues Raised By the Public Comments in Response to the Initial Regulatory Flexibility Analysis, a Summary of the Assessment of the Agency of Such Issues, and a Statement of Any Changes Made in the Rule as a Result of Such Comments**

NMFS received many comments on the proposed rule and draft EIS during the public comment period. A summary of these comments and the Agency's responses are included in Appendix B of this document and will be included in the final rule. The specific economic concerns raised in the comments are also summarized here.

Comment 1 NMFS received comments regarding the current condition of shark product markets.

Response 1 NMFS examined the commercial shark fishing revenues over the past eight years in Chapter 6 of the Draft and Final EIS. Total ex-vessel revenue from small coastal shark meat has fluctuated between approximately \$535 thousand and \$823 thousand annually over that period with no discernable pattern.

Comment 2 Another comment noted that there is little or no fin value for smooth dogfish.

Response 2 NMFS estimates that the median ex-vessel price for smooth dogfish fins was \$2.02 per pound between 2004 and 2007. Based on ACCSP data from 1998-2007, in the commercial fishery an average of 1,321,695 lb ww of smooth dogfish were retained per year. Of this total, NMFS estimates 47,543 lb of fins would be available for sale per year. Using the median ex-vessel price of these products between 2004 and 2007, the fishery averaged \$ 96,037 in value per year.

Comment 3 NMFS received a comment regarding the ability to distribute the small SCS quota across all the permit holders.

Response 3 NMFS examined the per vessel impacts of the proposed SCS quotas across all permit holders in the IRFA and also in this FRFA. Based on data from 2004 to 2007 for directed and incidental shark permit holders that landed non-blacknose SCS, the average directed shark permit holder earned \$9,427 in average annual gross revenues, and the average incidental shark permit holder earned \$707 in average annual gross revenues from non-blacknose SCS landings. For those permit holders that actually landed blacknose shark during that same time period, the average directed shark permit holder earned \$3,640 in average annual gross revenues, and the average incidental shark permit holder earned \$1,722 in average annual gross revenues from blacknose shark landings. NMFS acknowledges that the availability of SCS quota proposed in the DEIS would be limited if spread across all permit holders. As described in the responses above, NMFS made changes to the SCS quotas based, in part, on the comments received. The preferred alternative in the FEIS for small coastal sharks is now 221.6 mt versus 56.9 mt preferred under the DEIS. The preferred alternative for blacknose shark quota was raised from 14.9 mt under the DEIS to 19.9 mt in the FEIS.

Comment 4 A comment indicated that multispecies fishermen need every species they can catch. The commenter was concerned that the economic impacts on these multispecies fishermen were not considered.

Response 4 NMFS examined the cumulative economic impacts of the proposed rule in section 4.11 of the EIS.

Comment 5 Another comment NMFS received noted that the fins attached rule decreased fishing effort on SCS because it is too much work processing the sharks twice

in hot weather. Prices are lower for SCS because the fins on rule decreased the quality due to increased processing time. NMFS acknowledges that the fins on rule could decrease the quality of the product due to increased processing time. However, other factors such as market demand and decreased supplies might also affect prices.

Response 5 NMFS will examine the impacts that leaving fins on sharks is having on prices for SCS as information becomes available.

Comment 6 NMFS received a comment noting that shortfin mako sharks are a significant secondary bycatch for the US pelagic fishing fleets from Maine to Texas and like most sharks this is a shared resource with other countries. The comment noted that NMFS is unilaterally proposing to hurt US fishermen first with economic impacts. NMFS acknowledges that the shortfin mako shark is often a bycatch species in other fisheries in the United States.

Response 6 The preferred alternatives for the commercial shortfin mako shark fishery would not change the current retention limits for U.S. fishermen at this time. NMFS would promote the live release of shortfin mako sharks, but would not make it a mandatory requirement of the fishery. NMFS is preferring to take action at the international level to end overfishing of shortfin mako sharks through participation in international fisheries organizations such as ICCAT. While the preferred alternatives could impact U.S. fishermen economically before it impacts fishermen in other countries, neither of these measures are expected to have a significant economic impact on U.S. commercial fishermen.

Comment 7 NMFS also received comments that the preferred blacknose shark recreational alternative in the DEIS would eliminate the recreational fishery and that there are no analyses of the economic benefits to the nation associated with this defacto allocation to the commercial sector.

Response 7 NMFS notes that blacknose sharks rarely reach a size greater than the current federal minimum size, therefore, the current 54 inch FL size limit creates a defacto retention prohibition of blacknose sharks in federal waters. As discussed in the DEIS, NMFS determined that prohibiting the retention of blacknose sharks in the recreational fishery under Alternative D4 could have some negative social and economic impacts on recreational fishermen, including tournaments and charter/headboats, if the prohibition of blacknose sharks resulted in fewer charters. However, since blacknose sharks are not one of the primary species targeted by recreational anglers, in tournaments or on charters and they rarely reach a size greater than the current federal minimum size, NMFS does not anticipate much negative social and economic impacts from Alternative D4 on recreational anglers, tournaments, or in the charter/headboat sector. In the FEIS, Alternative D1 is the preferred alternative because the effect is the same as prohibiting the retention of blacknose sharks, thereby contributing to the rebuilding of the species. NMFS chose to prefer this alternative rather than the previously preferred alternative, Alternative D4, because the effect is the same, therefore action is unnecessary.

Comment 8 A few commenters, including the State of Virginia, noted that there is no indication that finning has been, is, or is likely to become a problem in the smooth dogfish fishery because of the economics of the fishery. The State of Virginia notes that the smooth dogfish fishery subsists as a high volume and labor intensive endeavor, as a typical whole round weight of 1,000 pounds contains 200 to 250 individual dogfish. In a typical processed catch of smooth dogfish, the dockside value of the fins represents 20 to 30 percent of the price paid to fishermen for their total catch, and fishermen return dockside with meat and fins in separate containers. Delaying the removal of fins and tail until landing would result in decreased marketability. Smooth dogfish are harder than other species to extract from the net, butcher and clean, with the result that labor costs represent a higher percentage of the total value of the product. Cutting fins at sea is important practically to the fishery in order to maintain proper product freshness. In the absence of processing, there would be a loss of profitability to the industry because of the increased labor with re-handling each carcass.

Response 8 NMFS appreciates the State of Virginia's comment regarding finning and the smooth dogfish fishery. NMFS agrees that the smooth dogfish fishery is likely a labor intensive operation. While the delay in the removal of fins and tails until landing could reduce the quality and marketability of smooth dogfish, it is unclear whether any decreases in ex-vessel prices would exceed potential cost savings from reduced labor needs at sea associated with finning on the vessel. There would potentially be an increase in operating costs at dealers, if they end up processing the fins from the smooth dogfish carcasses.

Comment 9 Another comment noted that if NMFS set the smooth dogfish quota at 1,423,728 lb dw, the quota may not be reached every year but there would be years when it is. The comment also mentioned that pricing is dependent on the international market (years when the price is high, the quota will go fast).

Response 9 The proposed smooth dogfish quota in the DEIS was developed in order to accommodate average fishing levels. The 1,423,728 lb dw proposed quota was equal to the maximum annual landings between 1998-2007 plus one standard deviation. NMFS acknowledges that in rare years, this quota might constrain the fishery. In part to address this issue, NMFS added an additional alternative to the FEIS where the smooth dogfish quota would be set equal to the maximum annual landings from 1998-2007 plus two standard deviations (1,577,319 lb dw). This new preferred alternative should accommodate the potential few years were the smooth dogfish quota may exceed 1,423,728 lb dw. NMFS is also aware that international markets may impact the pricing of domestic smooth dogfish. However, NMFS does not currently have sufficient data on the fishery to model the degree to which high international prices may increase domestic landings of smooth dogfish.

### **8.3 Description and Estimate of the Number of Small Entities to Which the Final Rule Would Apply**

NMFS considers all HMS permit holders to be small entities because they either had average annual receipts less than \$4.0 million for fish-harvesting, average annual

receipts less than \$6.5 million for charter/party vessels, 100 or fewer employees for wholesale dealers, or 500 or fewer employees for seafood processors. These are the Small Business Administration (SBA) size standards for defining a small versus large business entity in this industry.

The preferred management measures would apply to the 502 commercial shark permit holders in the Atlantic shark fishery based on an analysis of permit holders on March 18, 2009. Of these permit holders, 223 have directed shark permits and 279 hold incidental shark permits. Not all permit holders are active in the fishery in any given year. NMFS estimates that between 2004 and 2007, approximately 85 vessels with directed shark permits and 31 vessels with incidental shark permits landed SCS. A further breakdown of these permit holders is provided in Table 3.26.

The recreational measures proposed would also impact HMS Angling category and HMS Charter/Headboat category permit holders. In general, the HMS Charter/Headboat category permit holders can be regarded as small businesses, while HMS Angling category permits are typically obtained by individuals who are not considered small entities for purposes of the RFA. In 2008, 4,837 vessels obtained HMS Charter/Headboat category permits. Table 3.27 provides the geographic distribution of these permit holders by state and the overall historic trend in the number of permit holders since 2006. It is unknown what portion of these permit holders actively participate in shark fishing or market shark fishing services for recreational anglers.

Finally, the preferred alternatives to add smooth dogfish under NMFS management and develop management measures, such as a federal permit requirement, would impact an additional group of small entities. The number of entities impacted by this preferred alternative cannot be precisely measured at this time, since there is currently no federal permit requirement for smooth dogfish fishing. Utilizing VTR and Coastal Logbook data, an estimate of the number of participants in the commercial smooth dogfish fishery can be calculated. Within the VTR data, a primarily Northeast U.S. reporting system, an average of 213 vessels reported smooth dogfish landings per year between 2004 and 2007. Within the Coastal Logbooks data, a primarily Southeast U.S. reporting system, an average of 10 vessels reported smooth dogfish landings per year between 2004 and 2007. From these data, an estimated 223 commercial vessels would require a smooth dogfish permit.

To estimate the number of recreational participants in the smooth dogfish fishery, NMFS examined MRFSS data. Based on MRFSS data from 2004 to 2007, an average of 58,161 smooth dogfish were retained per year by private anglers and CHBs in the recreational fishery. This number is the upper limit of participants in the federal recreational fishery of the species, and is likely much lower since multiple individual fish are expected to have been caught by one fisherman. Furthermore, based on the life history of the species and the fact the most recreational fisherman are shore-based, the vast majority of smooth dogfish caught recreationally are in coastal, state waters and would not require a federal HMS angling permit.

NMFS has determined that the proposed rule would not likely affect any small governmental jurisdictions. More information regarding the description of the fisheries affected, and the categories and number of permit holders can be found in Chapter 3.

#### **8.4 Description of the Projected Reporting, Record-keeping, and Other Compliance Requirements of the Proposed Rule, Including an Estimate of the Classes of Small Entities Which Would Be Subject to the Requirements of the Report or Record**

The commercial and recreational measures for SCS and pelagic sharks would not introduce any new reporting and record-keeping requirements. However, alternative F2, would implement federal management of smooth dogfish and establish a permit for commercial and recreational retention of smooth dogfish in federal waters.

The preferred federal permit requirement for smooth dogfish would allow NMFS to collect data regarding participants in the fishery and landings through federal shark dealer reports. The federal dogfish permit requirement would require a similar permit application to the other current HMS permits. The information collected on the application would include vessel information and owner identification and contact information. A modest fee to process the application and annual renewal would also likely be required. The cost would likely be similar to the current fee associated with the Atlantic Tunas General Category and Atlantic HMS Angling permits, which both cost \$16 in 2009 to obtain.

#### **8.5 Description of the Steps the Agency Has Taken to Minimize the Significant Economic Impact on Small Entities Consistent with the Stated Objectives of Applicable Statutes, Including a Statement of the Factual, Policy, and Legal Reasons for Selecting the Alternative Adopted in the Final Rule and the Reason That Each one of the Other Significant Alternatives to the Rule Considered by the Agency Which Affect Small Entities Was Rejected**

One of the requirements of a FRFA is to describe any alternatives to the proposed rule which accomplish the stated objectives and which minimize any significant economic impacts. These impacts are discussed below and in Chapters 4 and 6 of this document. Additionally, the Regulatory Flexibility Act (5 U.S.C. § 603 (c) (1)-(4)) lists four general categories of “significant” alternatives that would assist an agency in the development of significant alternatives. These categories of alternatives are:

1. Establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities;
2. Clarification, consolidation, or simplification of compliance and reporting requirements under the rule for such small entities;
3. Use of performance rather than design standards; and,
4. Exemptions from coverage of the rule for small entities.

In order to meet the objectives of this proposed rule, consistent with Magnuson-Stevens Act and ESA, NMFS cannot exempt small entities or change the reporting requirements only for small entities because all the entities affected are considered small entities. Thus, there are no alternatives discussed that fall under the first and fourth categories described above. NMFS does not know of any performance or design standards that would satisfy the aforementioned objectives of this rulemaking while, concurrently, complying with the Magnuson-Stevens Act. Thus, there are no alternatives considered under the third category. As described below, NMFS analyzed several different alternatives in this proposed rulemaking and provides rationale for identifying the preferred alternative to achieve the desired objective.

The alternatives considered and analyzed have been grouped into three major categories. These categories include commercial measures, recreational measures, and smooth dogfish. Under commercial measures, alternatives for SCS commercial quotas, gear restrictions, and pelagic shark effort controls were considered and analyzed. The SCS commercial quota alternatives include: (A1) maintain the existing SCS quota; (A2) establish a new SCS quota of 392.5 mt dw and a blacknose commercial quota of 13.5 mt dw; (A3) establish a new SCS quota of 42.7 mt dw and a blacknose commercial quota of 16.6 mt dw; allow all current authorized gears for sharks; (A4) establish a new SCS quota of 56.9 mt dw and a blacknose commercial quota of 14.9 mt dw; remove shark gillnet gear as an authorized gear for sharks; (A5) close the SCS fishery; and (A6) establish a new SCS quota of 221.6 mt dw and a blacknose commercial quota of 19.9 mt dw. The commercial gear restrictions alternatives include: (B1) maintain current authorized gears for commercial shark fishing; (B2) close shark gillnet fishery; remove gillnet gear as an authorized gear type for commercial shark fishing; and (B3) close the gillnet fishery to commercial shark fishing from South Carolina south, including the Gulf of Mexico and the Caribbean Sea. The pelagic shark effort controls alternatives include: (C1) keep shortfin mako sharks in the pelagic shark species complex and do not change the quota; (C2) remove shortfin mako sharks from pelagic shark species quota and establish a shortfin mako quota; (C3) remove shortfin mako sharks from pelagic shark species complex and place this species on the prohibited shark species list; (C4a) establish a minimum size limit for shortfin mako sharks that is based on the size at which 50 percent of female shortfin mako sharks reach the sexual maturity or 32 inches interdorsal length (IDL); (C4b) establish a minimum size limit for shortfin makos that is based on the size at which 50 percent of male shortfin mako sharks reach the sexual maturity or 22 inches IDL; (C5) take action at the international level to end overfishing of shortfin mako sharks; and (C6) promote the release of shortfin mako sharks brought to fishing vessels alive.

Under recreational measures, NMFS considered alternatives for both SCS and pelagic sharks. The recreational measures considered for SCS include: (D1) maintain the current recreational retention and size limit for SCS; (D2) modify the minimum recreational size for blacknose sharks based on their biology, (D3) increase the retention limit for Atlantic sharpnose sharks based on current catches; and (D4) prohibit retention of blacknose sharks in recreational fisheries. The recreational measures considered for pelagic sharks include: (E1) maintain the current recreational measures for shortfin mako

sharks; (E2a) establish a minimum size limit for shortfin makos that is based on the size at which 50 percent of female shortfin mako sharks reach sexual maturity or 108 in FL; (E2b) establish a minimum size limit for shortfin makos that is based on the size at which 50 percent of male shortfin mako sharks reach sexual maturity or 73 inches FL; (E3) take action at the international level to end overfishing of shortfin mako sharks; (E4) promote the release of shortfin mako sharks brought to fishing vessels alive; and (E5) prohibit retention of shortfin mako sharks in recreational fisheries (catch and release only).

Finally, NMFS also considered alternatives for managing smooth dogfish. These alternatives include: (F1) do not add smooth dogfish under NMFS management, (F2) add smooth dogfish under NMFS management and establish a federal permit requirement, and (F3) add smooth dogfish under NMFS management and mirror management measures implemented in the ASMFC Interstate Shark FMP. NMFS considered several alternatives for adding smooth dogfish under NMFS management. These alternatives include: (F2 a1) Establish a smooth dogfish quota that is equal to the average annual landings from 1998-2007 (950,859 lb dw); (F2 a2) establish a smooth dogfish quota equal to the maximum annual landing between 1998-2007 (1,270,137 lb dw); (F2 a3) establish a smooth dogfish quota equal to the maximum annual landing between 1998-2007 plus one standard deviation (1,423,727 lb dw); (F2 b1) establish a separate smooth dogfish set-aside quota for the exempted fishing program of 6 mt ww; and (F2 b2) establish a smooth dogfish set-aside quota for the exempted fishing program and add it to the current 60 mt ww set aside quota for the exempted fishing program.

The potential impacts these alternatives may have on small entities have been analyzed and are discussed in the following sections. The preferred alternatives in the FEIS include: A6, B1, C5, C6, D1, E3, E4, F2, and preferred sub-alternatives F2 a4 and F2 b1. The economic impacts that would occur under these preferred alternatives were compared with the other alternatives to determine if economic impacts to small entities could be minimized while still accomplishing the stated objectives of this rule.

## **8.5.1 Commercial Measures**

### **8.5.1.1 SCS Commercial Quotas**

Under the No Action alternative, A1, there would be no additional economic impacts to directed and incidental shark permit holders as the average annual gross revenues from SCS landings, including blacknose shark landings, would be the same as the status quo. The average annual gross revenues from 2004 through 2007 from all SCS meat and fins was \$830,918.

Based on data from 2004 to 2007 for directed and incidental shark permit holders that landed non-blacknose SCS, the average directed shark permit holder earned \$9,765 in average annual gross revenues, and the average incidental shark permit holder earned \$687 in average annual gross revenues from non-blacknose SCS landings. For those permit holders that actually landed blacknose shark during that same time period, the average directed shark permit holder earned \$3,638 in average annual gross revenues, and the average incidental shark permit holder earned \$1,721 in average annual gross

revenues from blacknose shark landings. These revenues are not expected to be impacted by alternative A1. However, since alternative A1 would not reduce blacknose shark mortality to the level needed to rebuild blacknose sharks, NMFS does not prefer this alternative at this time.

Under the revised alternative A2, NMFS would remove blacknose sharks from the SCS quota and create a blacknose shark-specific quota of 12.1 mt dw and a separate “non-blacknose SCS” quota, which would apply to finetooth, Atlantic sharpnose, and bonnethead sharks, of 221.6 mt dw. NMFS anticipates that non-blacknose SCS landings should not decrease as the non-blacknose SCS quota would only be reduced by the average blacknose shark landings. Therefore, the 68 directed and 29 incidental shark permit holders that had non-blacknose SCS landings would not be affected by the new non-blacknose SCS quota. However, the blacknose shark quota would be a 78-percent reduction based on average landings from 2004-2007. Average annual gross revenues for the blacknose shark landings for the entire fishery would decrease from \$172,110 under the No Action alternative down to \$33,611 under alternative A2, which is an 80-percent reduction in average annual gross revenues for blacknose sharks. Thus, the 44 directed and 7 incidental shark permit holders that had blacknose shark landings would be affected by the new blacknose shark quota. As directed permit holders landed the majority of blacknose shark under the No Action alternative, it is anticipated that directed permit holders would experience the largest impacts under alternative A2. The decrease in average annual gross revenues for directed and incidental permit holders would depend on the specific trip limit associated with the blacknose quota established under A2 (see Appendix A). However, because discards would continue as fishermen directed on non-blacknose SCS, regardless of the retention limits, overall mortality for blacknose sharks would still be above the commercial allowance of 7,094 blacknose sharks/year, even if the retention of blacknose sharks was prohibited (see Appendix A). Therefore, NMFS does not prefer this alternative at this time.

Under the revised alternative A3, NMFS would remove blacknose sharks from the SCS quota and create a blacknose shark-specific quota of 19.9 mt dw and a separate “non-blacknose SCS” quota of 110.8 mt dw, which would apply to finetooth, Atlantic sharpnose, and bonnethead sharks. NMFS determined that by reducing the overall SCS fishery, NMFS would reduce the level of blacknose shark discards such that the total blacknose shark mortality would stay below the commercial allowance (see Appendix A).

While trip limits would not change for non-blacknose SCS for directed and incidental permit holders (*i.e.*, no trip limit for directed fishermen and a 16 non-blacknose SCS/pelagic sharks combined trip limit for incidental fishermen), given the reduction in the non-blacknose SCS quota, NMFS anticipates that the 68 directed and 29 incidental permit holders that had non-blacknose SCS landings would be affected by the new non-blacknose SCS quota. Average annual gross revenues for non-blacknose SCS landings for the entire fishery are anticipated to be \$310,222. This is a 53 percent reduction in average annual gross revenues compared to average annual gross revenues expected under the No Action alternative, A1. Since directed permit holders land approximately 97 percent of the non-blacknose SCS landings as explained in alternative A1, NMFS

anticipates that directed permit holders would lose more in average annual gross revenues from non-blacknose SCS landings compared to incidental permit holders under alternative A3. Average annual gross revenues for directed shark permit holders of non-blacknose SCS under alternative A3 would be \$300,916, which is a loss of \$343,200 in average annual gross revenues or a 53-percent reduction in average annual gross revenues from the average annual gross revenues expected under the No Action alternative, A1. Spread amongst the directed shark permit holders that land non-blacknose SCS, this is an anticipated loss of \$5,047 in average annual gross revenues from non-blacknose SCS landings per permit holder. Incidental permit holders land approximately 3 percent of the non-blacknose SCS. Average annual gross revenues for incidental shark permit holders of non-blacknose SCS under alternative A3 would be \$9,307, which is a loss of \$10,614 in average annual gross revenues or also a 53 percent reduction in average annual gross revenues from the average annual gross revenues expected under the No Action alternative, A1. Spread amongst the incidental shark permit holders that land non-blacknose SCS, this is an anticipated loss of \$366 in average annual gross revenues from non-blacknose SCS landings per permit holder.

The blacknose shark quota would be reduced to 19.9 mt dw based on average landings from 2004-2008. In addition, in order to keep the total mortality of blacknose sharks below the commercial allowance for the HMS Atlantic shark fishery (see Appendix A), incidental shark permit holders would not be allowed to retain blacknose sharks under alternative A3. Thus, the 44 directed and 7 incidental shark permit holders that had blacknose shark landings would be affected by the new blacknose shark quota. Since incidental permit holders would not be able to retain blacknose sharks, the total blacknose shark quota would be available only to directed shark permit holders. Average annual gross revenues for the blacknose shark landings for the directed fishery would decrease from \$160,062 under the No Action alternative down to \$51,409 under alternative A3, which is a loss of \$108,653 or a 68-percent reduction in average annual gross revenues for blacknose sharks for directed shark fishermen. Spread amongst the directed shark permit holders that land blacknose sharks, there would be an anticipated loss of \$2,469 in average annual gross revenues from blacknose landings per permit holder. However, since incidental shark permit holders would not be able to retain blacknose sharks, they would lose an estimated \$8,179 in average annual gross revenues from blacknose shark landings. Spread amongst the incidental permit holders that land blacknose sharks, there would be an anticipated loss of \$1,168 in average annual gross revenues from blacknose landings per permit holder.

Given the large reduction in the non-blacknose SCS quota under alternative A3, which would affect more directed and incidental permit holders compared to the smaller reduction in the non-blacknose SCS quota under alternative A6, NMFS does not prefer alternative A3 at this time.

Under alternative A4, NMFS would remove blacknose sharks from the SCS quota and create a blacknose shark-specific quota and a separate “non-blacknose SCS” quota equal to 55.4 mt dw, which would apply to finetooth, Atlantic sharpnose, and bonnethead sharks. NMFS determined that by reducing the overall SCS fishery, NMFS could reduce

the level of blacknose shark discards such that the total blacknose shark mortality would stay below the commercial allowance (see Appendix A). NMFS would establish a blacknose-specific quota of 15.9 mt dw, which is the amount of blacknose sharks that would be landed while the non-blacknose SCS quota is taken (see Appendix A); however, incidental fishermen would not be allowed to retain any blacknose sharks under alternative A4. In addition, this alternative assumes that gillnet gear would not be used to harvest sharks as explained under alternatives B2 and B3.

While trip limits would not change for non-blacknose SCS for directed and incidental permit holders (*i.e.*, no trip limit for directed fishermen and a 16 non-blacknose SCS/pelagic sharks combined trip limit for incidental fishermen), given the reduction in the non-blacknose SCS quota, NMFS anticipates that the 41 directed and 22 incidental shark permit holders that did not use gillnet gear to land non-blacknose SCS would be affected by the new non-blacknose SCS quota. Average annual gross revenues for non-blacknose SCS landings for the entire fishery are anticipated to be \$155,111. This is a 76-percent reduction in average annual gross revenues compared to the average annual gross revenues expected under the No Action alternative, A1. Since directed shark permit holders land approximately 97 percent of the non-blacknose SCS landings as explained in alternative A1, NMFS anticipates that directed shark permit holders would lose more in average annual gross revenues from non-blacknose SCS landings compared to incidental shark permit holders under alternative A4. Average annual gross revenues for directed shark permit holders of non-blacknose SCS under alternative A4 would be \$150,458, which is a loss of \$493,658 in average annual gross revenues or a 77-percent reduction in average annual gross revenues from the average annual gross revenues expected under the No Action alternative, A1. Spread amongst the directed shark permit holders that did not use gillnet gear to land non-blacknose SCS, there could be an anticipated loss of \$12,040 in average annual gross revenues from non-blacknose SCS landings per permit holder. Incidental shark permit holders land approximately 3 percent of the non-blacknose SCS landings as explained in alternative A1. Average annual gross revenues for incidental shark permit holders of non-blacknose SCS under alternative A4 would be \$4,653, which is a loss of \$15,268 in average annual gross revenues or a 77 percent reduction in average annual gross revenues from the average annual gross revenues expected under the No Action alternative, A1. Spread amongst the incidental shark permit holders that did not use gillnet gear to land non-blacknose SCS, there could be an anticipated loss of \$694 in average annual gross revenues from non-blacknose SCS landings per permit holder.

The blacknose shark quota would also be a 72-percent reduction based on average landings from 2004 through 2008. In addition, in order to keep the total mortality of blacknose sharks below the commercial allowance for the HMS Atlantic shark fishery (see Appendix A), incidental shark permit holders would not be allowed to retain blacknose sharks under alternative A4. Thus, the 15 directed and 5 incidental shark permit holders that did not use gillnet gear to land blacknose sharks would be affected by the new blacknose shark quota. Since incidental shark permit holders would not be able to retain blacknose sharks, the total blacknose shark quota would be available only to directed shark permit holders. Average annual gross revenues for the blacknose shark

landings for the directed fishery would decrease from \$160,062 under the No Action alternative down to \$41,075 under alternative A4, which is a loss of \$118,987 or a 74 percent reduction in average annual gross revenues from blacknose sharks for directed shark permit holders. Spread amongst the directed shark permit holders that did not use gillnet gear to land blacknose sharks, there could be an anticipated loss of \$7,932 in average annual gross revenues from blacknose landings per vessel. Incidental shark permit holders would lose an estimated \$12,048 in average annual gross revenues from blacknose shark landings. Spread amongst the incidental shark permit holders that did not use gillnet gear to land blacknose sharks, there could be an anticipated loss of \$1,791 in average annual gross revenues from blacknose landings per permit holder.

By reducing effort in the overall SCS fishery under Alternative A4, NMFS could reduce the level of blacknose shark discards such that the total blacknose shark mortality would stay below the commercial allowance needed to rebuild the stock. Gillnet fishermen would be affected the most by alternative A4 in combination with alternative B2 or B3, with estimated gross revenue losses between \$377,928 and \$365,067 from lost non-blacknose SCS and blacknose landings.

Alternative A5 would close the entire SCS commercial shark fishery, prohibiting the landing of any SCS, including blacknose sharks. Thus, this alternative would eliminate landings of all SCS, including finetooth, Atlantic sharpnose, bonnethead, and blacknose sharks. This would have negative economic impacts on the average 85 directed shark permit holders, and the average 31 incidental shark permit holders that had SCS landings during 2004-2007. This would result in a loss of average annual gross revenues of \$664,037 for non-blacknose SCS and \$172,110 from blacknose shark landings for a total loss of \$830,918 in average annual gross revenues from SCS landings. Directed shark permit holders would lose \$644,116 in average annual gross revenues from non-blacknose SCS landings and \$160,062 in average annual gross revenues from blacknose shark landings for a total of \$805,990 in average annual gross revenues. Spread among the 85 directed shark permit holders that landed SCS, this could result in a loss in average annual gross revenues of \$9,482 per permit holder.

Incidental shark permit holders would lose \$19,921 in average annual gross revenues from non-blacknose SCS landings and \$12,048 in average annual gross revenues from blacknose shark landings for a total of \$31,969 in average annual gross revenues under alternative A5. Spread among the 31 incidental shark permit holders that landed SCS, this could result in a loss in average annual gross revenues of \$1,031 per permit holder.

In addition, as gillnet gear is the primary gear used to target SCS, it is assumed that directed shark gillnet fishing would end, except for fishermen that use gillnet gear to strikenet for blacktip sharks. Approximately 11 directed shark permit holders use gillnet gear to land LCS. This would result in a decrease in LCS landings of 102,171 lb dw and a decrease in average annual gross revenues of \$107,280. Spread among the 11 directed shark permit holders that land LCS with gillnet gear, this alternative would result in a loss in average annual gross revenues of \$9,753 per permit holder.

While this alternative could reduce blacknose mortality below the commercial allowance of 44,853.8 lb dw, it would also completely eliminate the fishery for all SCS. Of the alternatives analyzed, alternative A5 would result in the most significant economic impacts to small entities. In addition, this alternative would severely curtail data collection on all SCS that could be used for future stock assessments. Thus, NMFS does not prefer this alternative at this time.

Alternative A6, the preferred alternative, combines parts of alternatives A2 and A3 that would establish a blacknose species-specific quota of 19.9 mt dw and a non-blacknose SCS quota of 221.6 mt dw. NMFS designed this alternative to minimize economic impacts on shark fishermen and other participants in the fishery related to SCS quota reductions. Alternative A6 would set the non-blacknose SCS quota at a level equal to the average annual landings from 2004 through 2008, and the blacknose quota at a level that is a 64 percent reduction of the average landings for that species over the same time period. This proposal comes in response to recently updated SEFSC data used for analysis, and in response to concerns raised by the commercial and scientific communities during the comment period for the DEIS. Under alternative A6 all currently authorized gears for shark fishing would be allowed in the fishery.

Under the non-blacknose SCS quota proposed in alternative A6, those fishermen with the 68 directed shark permits and 29 incidental shark permits that had non-blacknose SCS landings would be expected to fish as they currently do under the No Action alternative, and shark dealers and other entities that deal with shark products would be expected to operate as they do under the No Action alternative. Average annual gross revenues for non-blacknose SCS landings for the entire fishery are anticipated to decline by approximately 6-percent compared to the No Action alternative, to \$620,445, (Table 6.16) under alternative A6, representing a revenue loss of \$43,593. Average annual gross revenue for blacknose shark landings for the entire fishery is expected to decline to \$55,278, a loss of \$ 116,832.

Since directed shark permit holder accounted for 97 percent of the landings for non-blacknose SCS, the total revenue for these fishermen would decrease by 6 percent to \$601,832 (Table 6.16), a loss of \$42,284 from the No Action alternative non-blacknose directed shark permit revenue total of \$644,116 (Table 6.8). Spread across the 68 directed shark permit holders that reported non-blacknose landings, this would result in a per boat decrease of \$622 ( $\$42,284 / 68$  directed vessels = \$622). With incidental shark permit holders accounting for 3 percent of the annual revenue from non-blacknose landings based on alternative A6, there would be a decrease in total revenue of \$1,308, or 7 percent, to \$18,613 (Table 6.9) from the No Action Alternative of \$19,921 (Table 6.8). This would result in a loss of revenue from non-blacknose SCS per incidental vessel of \$45 ( $\$1,308 / 29$  incidental vessels = \$45). Therefore, social and economic impacts of the non-blacknose SCS quota on fishermen with directed and incidental shark permit would be slightly negative under alternative A6.

Under the blacknose shark quota 19.9 mt dw, the 44 directed shark permit holders and 7 incidental shark permit holders that had blacknose shark landings would experience

direct negative social impacts, as they would most likely have to fish in other fisheries to make up for lost blacknose landings or leave the fishery altogether. Other entities that deal with blacknose shark products, such as shark dealers, would indirectly experience negative social impacts as they would also have to change their business practices to make up for lost blacknose shark product. In total, average annual gross revenues for the blacknose shark landings for the directed shark permit holders would decrease from \$160,062 under the No Action alternative (Table 6.8) down to \$51,409 under alternative A6 (Table 6.16), which is a loss of \$108,653 or a 68 percent reduction in average annual gross revenues for blacknose sharks for directed shark fishermen. Spread amongst the directed shark permit holders that land blacknose sharks, there could be an anticipated loss of \$2,469 in average annual gross revenues from blacknose landings per permit holder ( $\$108,653 / 44$  directed vessels = \$2,469 per vessel). For incidental shark permit holders the 68-percent reduction in blacknose shark landings would translate into an average annual gross revenue of \$3,869 (Table 6.10), which would be a loss of income of \$8,179 from the annual average of \$12,048 under the No Action alternative (Table 6.8). Spread amongst the 7 incidental shark permit holders, this would result in an annual loss of \$1,168 per permit holder ( $\$8,179 / 7$  incidental vessels = \$1,168).

Under alternative A6, if either the non-blacknose SCS quota (221.6 mt dw) or blacknose shark quota (19.9 mt dw), reached 80 percent of the available landings, NMFS would close both fisheries for the rest of the season. If a future stock assessment determines that blacknose sharks are continuing to be overfished or that overfishing is still occurring NMFS could make regulatory changes as needed in future management actions. These changes may include, but are not limited to reducing the blacknose shark quota and/or the non-blacknose SCS quota, and implement daily blacknose catch limits. Alternative A6 would meet the rebuilding requirements of the Magnuson-Stevens Act by addressing the overfished status and overfishing of blacknose sharks by reducing the blacknose shark quota to 19.9 mt dw. While NMFS recognizes that there may be negative social and economic impacts on parts of the fishing community due to the reduced blacknose shark quota, in selecting the quota of 221.6 mt dw for the non-blacknose SCS fishery, NMFS is minimizing those negative socioeconomic impacts, especially since the bulk of the catch in the SCS fishery comes from shark species that have been determined to not be overfished or undergoing overfishing (i.e. finetooth, sharpnose, and bonnethead sharks). Therefore, NMFS prefers alternative A6 at this time..

Alternative A6 would result in positive ecological impacts to blacknose sharks by reducing mortality of this species below the commercial allowance of 7,094 blacknose sharks per year that is necessary for this stock to rebuild with a 70 percent probability by 2027 consistent with the rebuilding plan and the objectives of this amendment. Alternative A6 would also reduce effort and mortality in the non-blacknose SCS fishery, to a level that is equal to the average landings for these species for the years 2004 through 2008. Alternative A1 (No Action alternative) does not reduce effort or mortality in the commercial SCS fishery, so does not address the overfished status or overfishing of blacknose sharks. The scenarios under alternative A2 that eliminate gillnets as an authorized gear and those that eliminate retention of blacknose sharks altogether, fail to meet the goal of reducing blacknose shark mortality, due to the high number of discards

of blacknose sharks from those gears that would continue to operate in the fishery. For those scenarios under alternative A2 that would continue to allow gillnets to be retained as an authorized gear, the necessary reduction in blacknose sharks is met, but the quota is exceeded. Under alternative A3 the goal of reducing the blacknose shark mortality to necessary levels is obtained, but due to the significant reduction of the non-blacknose SCS quota, there would be a 67 percent increase in discard mortality of non-blacknose SCS. Both alternatives A4 and A5 would achieve the necessary blacknose shark mortality reduction, but the social and economic impacts on the commercial shark permit holders from the reduced quotas would be significant.

Compared to the other alternatives analyzed, alternative A6 would result in the least negative social and economic impacts on the participants of the SCS commercial fishery while still meeting the goal of reducing mortality and rebuilding blacknose sharks. Under alternative A6, the non-blacknose SCS quota of 221.6 mt dw would result in a loss of \$43,592 in average annual revenues for all permit holders. The reduced blacknose quota of 19.9 mt dw would result in a loss of \$116,833 for all permit holders. Under alternative A2, directed and incidental permit holders would lose \$138,499 in average annual revenue, from the blacknose quota of 12.1 mt dw. Under alternative A3 as in alternative A6, the blacknose quota of 19.9 mt dw would result in an anticipated loss in average annual revenues for directed and incidental permit holders. The non-blacknose quota of 110.8 mt dw, under alternative A3, would result in a loss of average annual revenues to all permit holders of \$275,103. Under alternative A4, the reduction in blacknose quota to 15.9 mt dw would result in an average annual loss of revenues for all permit holders of \$124,853. With the prohibition on gillnets in alternative A4, all permit holders would lose approximately \$287,524 from the reduced non-blacknose SCS quota and many would have to completely change the way they fished, or to leave the fishery entirely. Because alternative A5 would completely close the SCS fishery, those directed and incidental permit holders that land non-blacknose SCS and blacknose sharks would be forced to move into other fisheries and would likely create pressure on other commercial species. While alternative A1 the No Action alternative, would have the least negative social and economic impacts on the SCS commercial fishery participants, this alternative does not reduce mortality of blacknose sharks in order to meet the rebuilding goals of this amendment or stop overfishing of this stock.

#### **8.5.1.2 SCS Commercial Gear Restrictions**

Under alternative B1, the preferred No Action alternative, NMFS would maintain the current gear restrictions for rod and reel, gillnet, and BLL gear. Between the DEIS and the FEIS, NMFS switched to this alternative as the preferred alternative to minimize the economic impacts to fishermen and other participants in the fishery. The economic impacts of alternative B1 would be the same as the status quo, and no negative economic impacts would be anticipated under alternative B1. On average from 2004-2007, the directed and incidental shark permit holders earned average annual gross revenues from SCS landings of \$833,634, while the directed and incidental permit holders that landed LCS earned larger gross revenues of \$3,328,663. The smooth dogfish fishery is smaller than the other fisheries and only has average annual gross revenues of \$371,786 for state and federally permitted fishermen reporting to the ACCSP. Based on this alternative, the

average annual gross revenues of these fisheries would remain the same as the status quo. The average number of directed and incidental shark permit holders that reported SCS landings in the Coastal Fisheries logbook from 2004-2007 were 116 (85 directed and 31 incidental shark permit holders), and the LCS fishery had an annual average of 162 permit holders (129 directed and 33 incidental shark permit holders) reporting LCS landings in the Coastal Fisheries logbook from 2004-2007. The number of permit holders would not be impacted by the No Action alternative. NMFS prefers this least cost SCS commercial gear restriction alternative.

Under alternative B2, NMFS would remove gillnet gear as an authorized gear type for commercial shark fishing. This alternative would have significant negative economic impacts by potentially affecting 30 directed and 7 incidental shark permit holders. On average, directed shark permit holders landed 289,546 lb dw of SCS with gillnet gear. This is equivalent to \$365,955 in lost average annual gross revenues from SCS landings for directed shark permit holders. Based on average ex-vessel prices per pound from 2004-2007, directed shark permit holders made \$807,792 in average annual gross revenues from SCS landings. On average, incidental shark permit holders landed 9,465 lb dw of SCS with gillnet gear. This is equivalent to \$11,973 in lost average annual gross revenues from SCS landings for incidental shark fishermen due to the prohibition of gillnet gear. Based on average ex-vessel prices per pound from 2004-2007, incidental shark permit holders made \$25,843 from SCS landings under the status quo. This represents a 45 percent reduction in SCS revenues for directed shark permit holders and a 46 percent reduction in SCS revenues for incidental shark permit holders compared to the No Action alternative, alternative B1.

This alternative would have a minimal negative economic impact on the LCS fishery. Only 11 directed and 5 incidental shark permit holders out of the 162 total shark permit holders would be affected. On average, directed shark permit holders landed 102,171 lb dw of LCS with gillnet gear. This is equivalent to \$107,280 in lost average annual gross revenues from LCS landings (3 percent reduction). On average, incidental shark permit holders landed 1,961 lb dw of LCS with gillnet gear. This is equivalent to \$2,059 in lost average annual gross revenues from LCS landings for incidental shark permit holders due to the prohibition of gillnet gear. In total (\$109,339), this is approximately 3 percent of the gross revenues for the entire LCS fishery under the status quo (*i.e.*, \$3,328,663).

Gillnets are also the primary gear type used to catch smooth dogfish. Within the VTR data, a primarily Northeast U.S. reporting system, an average of 213 vessels reported smooth dogfish landings per year between 2004 and 2007. Within the Coastal Fisheries Logbooks data, a primarily Southeast U.S. reporting system, an average of 10 vessels reported smooth dogfish landings per year between 2004 and 2007. From these data, an estimate of 223 vessels would require a smooth dogfish permit; however, as fishermen are currently not required to have a permit to retain smooth dogfish, this could be an underestimate of the number of fishermen that would require a federal commercial permit for smooth dogfish in the future. The average total annual landings from 1998-2007 was 950,859 lb dw (by state and federally permitted fishermen reporting to the

ACCSP, however, since fishermen do not have to currently report smooth dogfish landings, this could be an underestimate of total landings, and thus, an underestimate of average annual gross revenues for this fishery). Based on average ex-vessel prices per pound from 2004-2007, average annual gross revenues for the entire smooth dogfish fishery totaled \$371,786 from smooth dogfish landings. Based on the preferred alternative F2, which would require fishermen who fish for smooth dogfish in federal waters to obtain a federal smooth dogfish permit, then under alternative B2, those fishermen would not be able to use gillnet gear to land smooth dogfish. This would have a negative economic impacts on fishermen who previously used gillnet gear in federal waters to land smooth dogfish. However, as fishermen do not have to have a federal permit currently to land smooth dogfish, NMFS is uncertain the universe of fishermen who might be affected by alternatives B2 and F2 at this time. However, given the potential large negative economic impacts of this alternative to the SCS, LCS, and smooth dogfish fisheries, NMFS does not prefer this alternative at this time.

Under alternative B3, NMFS would close the commercial gillnet fishery from South Carolina south, including the Gulf of Mexico and the Caribbean Sea. This would have a negative economic impact on federally permitted directed and incidental fishermen. In the SCS fishery, this alternative would affect an average of 27 directed and 5 incidental shark permit holders out of the average 116 total shark permit holders that landed SCS from 2004-2007. The SCS gillnet fishery from South Carolina south accounts for 44 percent of the total directed shark permit holder landings, and 26 percent of landings in the incidental fishery. On average, directed shark permit holders landed 283,462 lb dw (\$358,261) of SCS with the gillnet gear from South Carolina south. Thus, directed shark fishermen would lose \$358,261 in average annual gross revenues from SCS landings from the gillnet prohibition under alternative B3. Based on average ex-vessel prices from 2004-2007, directed shark permit holders made \$807,792 in average annual gross revenues from SCS landings. On average, incidental shark permit holders landed 5,381 lb dw (\$6,807) of SCS with gillnet gear from South Carolina south. Thus, incidental shark permit holders would lose \$6,807 in average annual gross revenues from non-blacknose SCS landings under alternative B3. The directed and incidental shark permit holders would lose average annual gross revenues of \$365,068 from their current gross revenues of \$833,634.

This alternative would have minor economic impacts on the LCS fishery. It would only affect 12 directed and incidental shark permit holders. The directed shark permit holders would lose \$106,189 in average annual gross revenues from lost LCS landings in gillnet gear from South Carolina south under alternative B3. Incidental shark permit holders would lose \$290 from lost LCS landings in gillnet gear from South Carolina south. In total (\$106,479), this is only 3 percent of the average annual gross revenues (*i.e.*, \$3,328,663) from LCS landings compared to the LCS fishery under the status quo.

Alternative B3, in combination with the preferred alternative F2, would not affect the economics impacts of the smooth dogfish fishery. Smooth dogfish are primarily caught from North Carolina north. The average total landings/year is 950,859 lb dw/year

(by state and federally permitted fishermen reporting to the ACCSP, however, since fishermen do not have to currently report smooth dogfish landings, this could be an underestimate of total landings, and thus, an underestimate of average annual gross revenues for this fishery), which translates into average annual gross revenues of \$371,786 lb dw/year from smooth dogfish landings. Given smooth dogfish are not typically landed with gillnet gear from South Carolina south, NMFS anticipates that this alternative, in combination with the preferred alternative F2, would not cause significant loss in average annual gross revenues from smooth dogfish landings.

### **8.5.1.3 Pelagic Shark Effort Controls**

The No Action alternative, C1, would not modify or alter commercial fishing practices for shortfin mako sharks or other shark species. There would be no additional economic impacts to directed and incidental fishermen as the average annual gross revenues from shortfin mako sharks or other shark species would be the same as the status quo. On average, 72.5 mt dw of shortfin mako sharks were commercially landed between 2004 and 2007, which is equivalent to \$350,039 in annual revenues. On average between 2004 and 2007, approximately 90 vessels had shortfin mako shark landings. Directed shark permit holders made up 39 of these vessels. However, since shortfin mako is typically incidentally caught, the average landings value per vessel was estimated by dividing annual revenues amongst all the vessels that have landed shortfin mako. Therefore, the vessels that landed shortfin mako generated an average of \$3,889 in gross revenues per year from shortfin mako sharks. The No Action alternative would not allow NMFS to meet statutory requirements to take measures to end overfishing. Thus No Action was not identified as a preferred alternative.

Alternative C2 would implement a species-specific quota for shortfin mako at the level of the average annual commercial landings for this species. This alternative is expected to have neutral or slightly negative economic impacts. On average, 72.5 mt dw (159,834 lb dw) of shortfin mako sharks were commercially landed between 2004 and 2007, which is equivalent to \$350,039 in average annual gross revenues. Spread amongst the vessels that landed shortfin mako sharks, the average vessel earned \$3,889 in annual gross revenues from shortfin mako sharks. While fishermen would be able to maintain current fishing effort under this alternative, any increase in effort would be restricted by the species-specific quota of 72.5 mt dw. Under the No Action alternative, commercial fishermen currently have a 488 mt dw quota, which could potentially be filled entirely by shortfin mako landings. This could result in maximum annual revenues equal to \$2,356,106. Thus, there is the potential loss of the option to fish up to the maximum level under this alternative. This difference is \$2,006,067 in annual gross revenues from shortfin mako sharks. Spread amongst the 90 vessels that, on average, have landed shortfin mako sharks from 2004 to 2007, that difference would be \$22,289 annually per vessel. However, given shortfin mako sharks are incidentally caught in the PLL fishery, it is unlikely that the entire pelagic shark quota would be entirely filled with shortfin mako landings. NMFS does not prefer this alternative at this time because the United States contributes a small portion of shortfin mako mortality due the lack of a directed fishery compared to shortfin mako mortality resulting from the fishing of foreign vessels

outside of the U.S. EEZ. In addition, this alternative does not minimize the potential economic impacts on small entities.

Alternative C3 would remove shortfin mako sharks from the pelagic shark species complex and add them to the prohibited species list. This alternative is not expected to have negative economic impacts for commercial fishermen because it is not a species that is targeted by commercial fishermen. Shortfin mako sharks are predominately caught incidentally in the PLL fishery and, on average, the commercial landings for shortfin mako sharks, from 2004 to 2007 were 72.5 mt dw with an estimated gross ex-vessel value of \$350,039. However, since shortfin makos would be placed on the prohibited species list under alternative C3, there could be an estimated reduction in average annual gross revenues of \$350,039 to the commercial fishermen. Based on the average number of vessels that have landed shortfin mako from 2004 to 2007, the revenue reductions would be approximately \$3,889 per vessel annually. In addition, this alternative could lead to increased operation time if commercial fishermen have to release and discard all shortfin makos that are caught on the PLL gear. In addition, if the commercial PLL fleet expands in the future, placing shortfin mako sharks on the prohibited species list could result in a loss of future revenues for the commercial PLL fishery. Thus, NMFS does not prefer this alternative at this time.

Alternative C4a would establish a minimum size limit for shortfin makos that is based on the size at which 50 percent of female shortfin mako sharks reach sexual maturity or 32 inches IDL. The summed dressed weight of all shortfin mako sharks kept under the 32 inches IDL size limit made up 1.4 percent of total dressed weight landings of shortfin mako sharks based on POP data. NMFS estimated this would reduce shortfin mako harvests by 2,061.1 lb dw. The economic impacts of this restriction would be an average annual gross revenues loss of \$4,513 for this fishery. Spread amongst the 90 vessels that have landed shortfin mako sharks from 2004 to 2007, the per vessel losses would be approximately \$50 annually.

Alternative C4b would establish a minimum size limit for shortfin makos that is based on the size at which 50 percent of male shortfin mako sharks reach sexual maturity or 22 inches IDL. The summed dressed weight of all kept shortfin mako sharks under the 22 inches IDL size limit made up 0.02 percent of dressed weight landings of shortfin mako based on POP data. NMFS estimated this would reduce shortfin mako harvests by 34.3 lb dw. The economic impacts of this restriction would be an average annual gross revenues loss of \$75 for this fishery.

Alternatives C4a and C4b would have minimal economic impacts because only a small percentage of commercial landings would be affected by the size restrictions. Of the two alternatives, the negative economic impact of C4a would be greater, as commercial landings by weight are 2,026.8 lb dw greater than in alternative C4b. Despite these minimum economic impacts, since the size limits would not reduce fishing mortality of shortfin mako sharks in the commercial sector, NMFS does not prefer these alternatives at this time.

Under alternative C5, the preferred alternative, NMFS would, take action at the international level through international fishery management organizations to establish management measures to end overfishing of shortfin mako sharks. In the short term, this alternative would not result in any negative economic impacts on commercial fishermen as it would not restrict commercial harvest of shortfin mako sharks, nor alter the pelagic shark quota. Therefore, the near term economic impacts of alternative C5 would be the same as described in the No Action alternative C1. However, this alternative could have negative economic impacts in the long term if directed management measures were adopted at an appropriate international forum that would require the reduction of landings domestically for shortfin mako sharks. Recommended reductions in landings, if implemented by multiple nations, would ultimately end overfishing of shortfin mako. Therefore, NMFS prefers alternative C5 at this time. Note that with respect to all shortfin mako commercial measures, alternatives C5 and C6 would have the lowest short-term economic impacts on fishermen and participants in the fishery.

Alternative C6, the preferred alternative, would promote the release of shortfin mako sharks brought to fishing vessels alive. This alternative would likely not result in any negative economic impacts on commercial fishermen as it does not restrict commercial harvest of shortfin mako sharks that are alive at haulback, and quotas and retention limits would remain as described in the No Action alternative C1. However, as this alternative could result in the reduction of fishing mortality of shortfin mako sharks by encouraging fishermen to release shortfin mako sharks brought to the fishing vessel alive, NMFS prefers this alternative at this time.

## **8.5.2 Recreational Measures**

### **8.5.2.1 *Small Coastal Sharks***

Under alternative D1, the preferred alternative, NMFS would maintain the current recreational management measures, including the current retention limits and size limits for SCS. Therefore, the economic impacts of alternative D1 would be the same as the status quo, and no negative economic impacts would be anticipated under alternative D1. Alternative D1 is the least costs alternative and NMFS prefers this alternative.

Alternative D2 would modify the minimum recreational size for blacknose sharks based on the biology of blacknose sharks. This would lower the current size limit from 54 inches FL to 36 inches FL, the size at which 50 percent of the female blacknose sharks reach sexual maturity. This could increase the landings of recreationally harvested blacknose sharks and, therefore, have positive economic impacts for small business entities supporting recreational fishermen. The potential for increased landings associated with the lower size limit could marginally increase demand for charter/headboat services and for products and service provided by shoreside businesses that support recreational fishermen. Since this alternative could result in the increase of blacknose shark recreational landings, and NMFS needs to reduce the number of blacknose shark landings in order to rebuild the stock, NMFS does not prefer this alternative at this time.

Alternative D3 would increase the retention limit for Atlantic sharpnose sharks based on their current catches and stock status. Any increase in the retention limit for Atlantic sharpnose sharks would provide positive economic impacts for recreational fishermen, especially if this resulted in more charter trips for charter/headboats. However, since the latest stock assessment suggests that increased fishing efforts could result in an overfished status and/or cause overfishing to occur in the future (NMFS, 2007), NMFS does not prefer this alternative at this time.

Under alternative D4, NMFS would prohibit the retention of blacknose sharks in the recreational fishery. While recreational fishermen could still catch blacknose sharks, they would not be permitted to retain blacknose sharks and would have to release them. This could have negative economic impacts on recreational fishermen, including tournaments and charter/headboats if the prohibition of blacknose sharks resulted in fewer charters and reduced tournament participation. However, since blacknose sharks are not one of the primary species targeted by recreational anglers, in tournaments, or on charters, NMFS does not anticipate large negative economic impacts from this alternative on tournaments or charter/headboat businesses.

#### **8.5.2.2 *Pelagic Sharks***

Maintaining the current recreational measures for shortfin mako sharks under alternative E1 would likely not result in any adverse economic impacts on small entities since the No Action alternative would not modify or alter recreational fishing practices for shortfin mako sharks or other shark species. However, this alternative would not meet the objective of this rule in reducing overfishing of shortfin mako sharks, thus, NMFS does not prefer this alternative at this time.

Alternative E2a would set a minimum size limit for shortfin mako sharks of 108 inches FL in the recreational fishery. This would have the most severe economic impacts of all the alternatives considered, as almost all of the reported shortfin mako sharks landed (99.5 percent) were smaller than the proposed 108 inch FL size limit and would have to be released. This alternative would basically create a catch-and-release fishery for shortfin mako sharks. The impacts of alternative E2b would be less severe than alternative E2a, as it would set a minimum size limit for shortfin mako sharks of 73 inches FL in the recreational fishery. This would result in a 60.3 percent overall reduction in recreational shortfin mako shark landings. Under this alternative, economic impacts would be greater on the non-tournament recreational mako shark fishery, as 81 percent of those landings would fall below the 73 inch FL size limit. The percentage of recreational landings during tournaments that would be released under alternative E2b would be less than the non-tournament recreational landings (51.7 percent to 81 percent, respectively). According to LPS data, 41 percent of shortfin mako sharks caught are kept; therefore, size limits in alternatives E2 may have a substantial economic impact on the recreational fishery. Thus, NMFS does not prefer E2a or E2b at this time.

Under alternative E3, NMFS would take action at the international level to end overfishing of shortfin mako sharks through participation in international fisheries organizations such as ICCAT. This alternative would not result in any changes in the

current recreational regulations regarding bag or size limits for shortfin mako sharks. Therefore, this alternative would likely not result in any negative economic impacts for recreational fishermen and the small businesses that support those recreational fishing activities in the short term as compared to the No Action alternative, E1. In addition, this alternative could help end overfishing of shortfin mako sharks in the long term through an international plan to conserve shortfin mako sharks. Therefore, NMFS prefers this alternative at this time.

Under alternative E4, NMFS would promote the live release of shortfin mako sharks in the recreational shark fishery, but this alternative would not result in any changes in the current recreational regulations regarding bag or size limits for shortfin mako sharks. Therefore, this alternative would likely not result in any economic impacts compared to the No Action alternative, alternative E1. However, it would encourage the live release of shortfin mako sharks, and could help reduce fishing pressure on this species. Therefore, NMFS prefers this alternative at this time.

Under alternative E5, NMFS would remove shortfin mako sharks from the authorized species list and add them to the prohibited species list. Placing shortfin mako sharks on the prohibited species list would make the recreational fishery for shortfin mako sharks a catch-and-release fishery. Although a small number of shortfin mako sharks were landed in the recreational fishery from 2004 to 2007, it is also an important fishing tournament species. Fishing tournaments are an important component of HMS recreational fisheries. In 2008, there were 42 shark tournaments throughout the U.S. Atlantic Coast, including the Gulf of Mexico and the Caribbean Sea. Therefore, adding this species to the prohibited species list could lead to negative economic impacts for tournament operators since they may have to modify their tournament rules and could face reduced demand for participation, and thus reduce revenues from entry fees. A recreational catch-and-release fishery for shortfin mako may also reduce demand for CHB trips that target shortfin mako sharks. In addition, since the United States only contributes to a small portion of the overall mortality for shortfin mako sharks, prohibiting them in the recreational fishery would not end overfishing for this species. Given these reasons and the economic impacts of this alternative are estimated to be higher than that of the preferred alternatives, NMFS does not prefer this alternative at this time.

### **8.5.3 Smooth Dogfish**

NMFS also considered alternatives regarding the potential inclusion of smooth dogfish under NMFS management. Smooth dogfish are currently not managed by NMFS, and stock data are sparse. Therefore, there is limited stock status information, participant information, and effort data for this fishery.

Under alternative F1, the no action alternative, NMFS estimates that there would not be any economic impacts to small entities beyond the status quo. This alternative would have the lowest costs alternative to small entities. However, applying the No Action alternative would not meet the objectives of this rule since it would preclude

gathering fishery participant information. Therefore, NMFS does not prefer this alternative at this time.

Implementing federal management of smooth dogfish through alternative F2 would focus on characterizing the fishery and stock status, but would not actively change catch levels or rates. Alternative F2 would require federal commercial and recreational fishing permits as well as require fishermen to land smooth dogfish with all of their fins naturally attached. These changes could result in short-term, direct significant adverse socioeconomic impacts on fishermen who are used to processing smooth dogfish at sea. Business entities that fish commercially for smooth dogfish would have to purchase an open access smooth dogfish commercial fishing permit, and dealers would have to report smooth dogfish landings. The costs to small entities would include the costs of obtaining the permit (approximately \$20 based on current permit fees), the time involved in completing the permit form, and the administrative costs associated with reporting landings. In addition, recreational anglers that would want to retain smooth dogfish in federal waters would need to purchase an HMS Angling category permit. While this alternative results in more costs to small entities than alternative F1, it helps meet the objectives of this rule of gathering more information on participation in this fishery, and therefore is preferred at this time. NMFS would delay the implementation of these requirements until the start of the 2012 fishing season to allow time for fishermen to adjust to the changes and to allow time for the development of a new commercial smooth dogfish permit. Thus, in the short-term, alternative F2 would result in significant but mitigated to be less than significant socioeconomic impacts due to the delay in implementation of these requirements. Once fishermen adjust to the new measures, NMFS anticipates that there would be no direct socioeconomic impacts to fishermen in the long-term.

Sub-alternatives F2 a1, which would establish a smooth dogfish quota that is equal to the average annual landings from 1998-2007, and F2 a2, which would establish a smooth dogfish quota equal to the maximum annual landing between 1998-2007, could potentially have negative economic impacts on fishermen if the associated quotas reflect a significantly underreported fishery. If the actual landings are higher than these two quotas, fishermen would be prevented from fishing at status quo levels, and thus experience negative economic impacts. Thus, NMFS does not prefer these two sub-alternatives at this time.

Alternative F2a3, which would establish a smooth dogfish quota above the maximum annual landings between 1998-2007, would have neutral to negative economic impacts. The quota of maximum historical annual landings plus one standard deviation between the years 1998 and 2007 could allow a buffer for potential unreported landings during that time. However, based on public comment, as detailed above, NMFS does not believe that this alternative would adequately account for underreporting.

Alternative F2a4, the preferred alternative, would establish a smooth dogfish quota above the maximum annual landings between 1998-2007 and would have neutral economic impacts. The quota of maximum historical annual landings plus two standard

deviations between the years 1998 and 2007 would allow a buffer for potential unreported landings during that time. This would allow the fishery to continue at the current rate and level into the future without having to be shut down prematurely. Thus, alternative F2a4 is NMFS' preferred alternative at this time.

There are no negative economic impacts anticipated with alternative F2 b1. There is no charge associated with fishermen and researchers obtaining an EFP, SRP, display permit, or LOA for research or the collection for public display. In addition, NMFS would establish a smooth dogfish set aside that would accommodate current and future research activities. Thus, NMFS does not anticipate any negative economic impacts associated with alternative F2 b1, and NMFS prefers sub-alternative F2 b1 at this time.

As with sub-alternative F2 b1, there are no negative economic impacts anticipated with sub-alternative F2 b2. There is no charge associated with fishermen and researchers obtaining an EFP, SRP, display permit, or LOA for research or for the collection for public display. In addition, NMFS would establish a smooth dogfish set-aside that would accommodate current and future research activities. Thus, NMFS does not anticipate any negative economic impacts associated with sub-alternative F2 b1.

Alternative F3, which would implement management measures for smooth dogfish that complement the ASMFC plan, would likely have neutral to slightly positive economic impacts. Most of the ASMFC regulations would not change the smooth dogfish fishery as it currently operates, fishermen would be required to leave the dorsal fin on the smooth dogfish through landing from July through February, which could change how the fishery operates, and therefore, have direct minor, adverse socioeconomic impacts in the short-term. The extent of these impacts will depend on how many smooth dogfish are landed between July and February of each year. Because this requirement began in state waters in January 2010, it could mitigate some of the economic impacts associated with alternative F2 with regard to the requirement of having all fins naturally attached under the federal plan. Thus, by the start of the fishing season in 2012, fishermen who have been fishing in state waters should have a better idea of how to keep all fins naturally attached.

Indirectly, in the short-term there are no indirect socioeconomic impacts expected for dealers and fish processors compared to the status quo as the fishery would continue to operate as it has been with the exception of the requirement to leave the dorsal fin on from July through February. However, if the requirement to have the dorsal fin attached during certain times of the year affects how dealers and processors process smooth dogfish, then there could be indirect, minor adverse economic impacts on smooth dogfish dealers until they learn how to process these sharks during July through February. However, since NMFS considers the requirements for gillnet checks and maintaining shark fins naturally attached through offloading necessary conservation tools for protected resources and to prevent shark finning, NMFS does not prefer this alternative at this time.

## **Chapter 8 References**

NMFS. 2007. SEDAR 13 Stock Assessment Report: Small Coastal Sharks, Atlantic Sharpnose, Blacknose, Bonnethead, and Finetooth Shark. Highly Migratory Species Management Division, 1315 East West Highway, Silver Spring, MD 20910. 375 pp.



## CHAPTER 9 TABLE OF CONTENTS

<b>Chapter 9 Table of Contents</b> .....	<b>9-i</b>
<b>9.0 Community Profiles</b> .....	<b>9-1</b>
9.1 Introduction.....	9-1
9.2 Methodology.....	9-2
9.2.1 Previous community profiles and assessments.....	9-2
9.3 Overview of the Shark Fishery.....	9-3
9.4 Summary of Fisheries Impacts.....	9-5
<b>Chapter 9 References</b> .....	<b>9-9</b>



## **9.0 COMMUNITY PROFILES**

### **9.1 Introduction**

The Magnuson-Stevens Act requires, among other things, that all FMPs include a fishery impact statement intended to assess, specify, and describe the likely effects of the measures on fishermen and fishing communities (§303(a)(9)).

NEPA requires federal agencies to consider the interactions of natural and human environments by using a “systematic, interdisciplinary approach which will ensure the integrated use of the natural and social sciences...in planning and decision-making” (§102(2)(A)). Moreover, agencies need to address the aesthetic, historic, cultural, economic, social, or health effects, which may be direct, indirect, or cumulative. Consideration of social impacts is a growing concern as fisheries experience increased participation and/or declines in stocks. The consequences of management actions need to be examined to better ascertain and, if necessary and possible, mitigate regulatory impacts on affected constituents.

Social impacts are generally the consequences to human populations resulting from some type of public or private action. Those consequences may include alterations to the ways in which people live, work or play, relate to one another, and organize to meet their needs. In addition, cultural impacts, which may involve changes in values and beliefs that affect people’s way of identifying themselves within their occupation, communities, and society in general are included under this interpretation. Social impact analyses help determine the consequences of policy action in advance by comparing the status quo with the projected impacts. Community profiles are an initial step in the social impact assessment process. Although public hearings and scoping meetings provide input from those concerned with a particular action, they do not constitute a full overview of the fishery.

The Magnuson-Stevens Act outlines a set of National Standards (NS) that apply to all fishery management plans and the implementation of regulations. Specifically, NS 8 notes that:

“Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to: (1) provide for the sustained participation of such communities; and, (2) to the extent practicable, minimize adverse economic impacts on such communities.” (§301(a)(8)). See also 50 CFR §600.345 for NS 8 Guidelines.

“Sustained participation” is defined to mean continued access to the fishery within the constraints of the condition of the resource (50 CFR §600.345(b)(4)). It should be clearly noted that NS 8 “does not constitute a basis for allocation of resources to a specific fishing community nor for providing preferential treatment based on residence in a fishing community” (50 CFR §600.345(b)(2)). The Magnuson-Stevens Act further defines a “fishing community” as:

“...a community that is substantially dependent upon or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and

includes fishing vessel owners, operators, crew, and fish processors that are based in such communities.” (§301(16))

Likewise, specific to development and amendment of HMS FMPs, the Magnuson-Stevens Act, paragraph 304(g)(1)(C), requires the Secretary to:

- Evaluate the likely effects, if any, of conservation and management measures on participants in the affected fisheries; and,
- Minimize, to the extent practicable, any disadvantage to U.S. fishermen in relation to foreign competitors.

NMFS (2001) guidelines for social impact assessments specify that the following elements are utilized in the development of FMPs and FMP amendments:

1. The size and demographic characteristics of the fishery-related work force residing in the area; these determine demographic, income, and employment effects in relation to the work force as a whole, by community and region.
2. The cultural issues of attitudes, beliefs, and values of fishermen, fishery-related workers, other stakeholders, and their communities.
3. The effects of proposed actions on social structure and organization; that is, on the ability to provide necessary social support and services to families and communities.
4. The non-economic social aspects of the proposed action or policy; these include life-style issues, health and safety issues, and the non-consumptive and recreational use of living marine resources and their habitats.
5. The historical dependence on and participation in the fishery by fishermen and communities, reflected in the structure of fishing practices, income distribution and rights.

## **9.2 Methodology**

### **9.2.1 Previous community profiles and assessments**

A complete description of the updated community profiles and assessments can be found in Chapter 6 of the 2008 SAFE Report (NMFS, 2008) for current HMS fisheries. Chapter 6 of the 2008 SAFE Report consolidated all of the communities profiled in previous HMS FMPs or FMP amendments and updated the community information where possible. Of the communities profiled in the 2008 SAFE Report, ten were originally selected due to the proportion of HMS landings in the town, the relationship between the geographic communities and the fishing fleets, the existence of other community studies, and input from the HMS and Billfish Advisory Panels. The remaining 14 communities, although not selected initially, have been identified as communities that could be impacted by changes to the current HMS regulations because of the number of HMS permits associated with these communities, and their community profile

information has been incorporated into the document. The descriptive community profiles in the 2008 SAFE Report are organized by state and include information provided by Wilson, *et al.* (1998), Kirkley (2005), Impact Assessment, Inc. (2004), and recent information obtained from MRAG Americas, Inc. (2008). However, as smooth dogfish are not currently federally managed, community profiles have not been completed for the fishery-related work force residing in communities affected by federal management of smooth dogfish. The preferred alternative F2 in this amendment will act as the first step of permitting and identifying those communities that participate in the smooth dogfish fishery so that community profiles can be completed at a later date.

In addition, please refer to the Description of the Affected Environment in Chapter 3, Environmental Justice analysis in Chapter 4, the Economic Evaluation in Chapter 6, the RIR in Chapter 7, and the FRFA in Chapter 8 of this document for additional information. Furthermore, each of the management alternatives in Chapter 4 includes an assessment of the potential socio-economic impacts associated with the preferred alternatives. The preferred alternatives were selected to minimize economic impacts and provide for the sustained participation of fishing communities, while taking the necessary actions to rebuild overfished fisheries as required by the Magnuson-Stevens Act.

### **9.3 Overview of the Shark Fishery**

The shark fisheries of the Atlantic and Gulf of Mexico extend from Maine to Texas, and include Puerto Rico and the U.S. Virgin Islands. The geographic extent of the shark directed and incidental commercial permit holders is large, but is currently concentrated in the waters off four states; Florida (55 percent of shark permits), New Jersey (11 percent of shark permits), Louisiana (8 percent of shark permits), and North Carolina (6 percent of shark permits). The primary smooth dogfish fishery is currently located from North Carolina to New Jersey. The LCS and SCS shark fishery is notable for the degree of flexibility of the commercial fishing fleet. Of the 502 vessels in the 2009 fleet, 223 vessels (44 percent) held directed shark fishery permits. The remaining 56 percent (279 vessels) held incidental permits that target species other than sharks. Traditionally fishermen who engaged in the directed shark fishery did so on a seasonal basis, depending on area and the length of the fishing season, and they fished for other species at other times of the year. However, under Amendment 2 to the Consolidated HMS FMP, it was NMFS intention to have the fishery stay open year-round, so that fishermen could fish for sharks in an incidental fashion while targeting other species, thus reducing discards of sharks. This would also allow for shark product to be available year round, thus stabilizing the market instead of having short periods of time with large volumes of shark product, as was the case prior to Amendment 2 to the Consolidated HMS FMP.

The SCS fishery is mainly concentrated in South Atlantic. Landings data by state from the Automated Landings Reporting Systems, or ALS, indicate that Florida's east coast accounted for the vast majority of SCS landings (56-94%) during 1995-2005, with the west coast of Florida contributing 1-30%, North Carolina always less than 5%, and South Carolina always less than 2% (Cortés and Neer, 2007). According to the landings data, Alabama started landing SCS in 2002 (4%), and the proportion of landings in that state increased in 2003-2005 (19-23%) (Cortés and Neer, 2007); however, shark fishing is largely incidental to recreational fishing for other species in Alabama (NMFS, 2008). Given the measures in this amendment would affect the SCS

fishery, it is anticipated that communities in these areas would most likely experience the largest socioeconomic impacts. Below, NMFS gives a brief description of a few of the main communities in these areas that could be affected by the preferred SCS measures in this amendment. More information on different communities can be found in Chapter 6 of the 2008 SAFE Report (NMFS, 2008).

SCS are landed with bottom longline gear; however, the predominate gear used to catch SCS is gillnet gear. The majority of shark gillnetters are located on the east coast of Florida, particularly in Fort Pierce, Florida area (NMFS, 2008). Commercial fishing has grown in this area due to lost dock space for commercial fleets in nearby ports (NMFS, 2008). For instance, Port Selerno, also on the east coast of Florida, used to have concentrations of longline vessels; however, due to gentrification and increasing fishery regulations, commercial fishing infrastructure has shrunk, and currently there is only one commercial facility remaining in the area) (MRAG Americas, Inc., 2008). Dealer and fish processors have consolidated buying and packing operation in Fort Pierce because of the high cost of doing business in more tourism-related coastal communities in Northern and Southern Florida. SCS shark fishing is a primary interest of gillnetters in Fort Pierce whereas bottom longline fishermen typically target LCS. While, these shark fisheries, and in particular, the SCS fishery, are lower in value compared to swordfish and tuna longline fisheries, the SCS fishery is the main fishery for shark gillnet fishermen located in the Fort Pierce, Florida area.

Madeira Beach, Florida, is located on the west coast of Florida. The Madeira Beach fleet is predominately comprised of bottom longline vessels and has been more reliant on the LCS fishery rather than the SCS fishery. Due to LCS shark fishing regulations, shark fishermen have left the shark fisheries altogether, and shark product has declined for dealers, who have experienced stiff competition as overall shark product has decreased (NMFS, 2008). North Carolina has historically been an important shark fishing state with 35 to 60 percent of all South Atlantic region landings coming from North Carolina in recent years (NMFS, 2008). The time/area closure implemented in January 2005, to protect essential fish habitat for sandbar and dusky sharks has forced commercial shark fishermen to seek out other fisheries or other gears to target sharks and other species. Many fishermen claim that the closure has hurt their business (NMFS, 2008). LCS landings, and in particular, sandbar shark landings, came from Hatteras and Wanchese, North Carolina. However, participation in commercial fishing, in general, in these areas has been on the decline due to difficulties in hiring and managing crews and due to high turnover in crews as vessels shift to other fisheries and/or revenues drop (NMFS, 2008). Many of the larger vessels have left these areas to pursue opportunities overseas, and others have left the commercial fishing industry to pursue careers in carpentry and building or the charter fishing business (NMFS, 2008). Finally, South Carolina residents hold approximately the fifth greatest number of shark permits; however, due to the relatively small number of HMS permit holders and landings in South Carolina, no community profiles have been developed for this state at this time (NMFS, 2008).

As mentioned above, the primary smooth dogfish fishery is currently located from North Carolina to New Jersey. However, as smooth dogfish are not currently federally managed, community profiles have not been completed for the fishery-related work force residing in communities affected by federal management of smooth dogfish. The preferred alternative F2 in

this amendment will act as the first step of permitting and identifying those communities that participate in the smooth dogfish fishery so that community profiles can be completed at a later date. In the meantime, NMFS assumes communities from North Carolina and Virginia would have the largest socioeconomic impacts due to smooth dogfish measures as explained below.

As of October 2009, there are 106 federally permitted shark dealers, the majority of which are located in Florida (37 percent). Table 3.29 shows the number of shark dealers permitted in each state as of November 2009. Dealers that possess shark permits also often hold dealer permits for other species such as swordfish, dolphin/wahoo, reef fish and snapper/grouper. The additional permits that the commercial shark fishermen and dealers possess may help mitigate economic and social impacts of the preferred management measures. For additional information on the directed and incidental shark fishery, please refer to Chapter 3, Description of the Affected Environment.

#### **9.4 Summary of Fisheries Impacts**

The following provides a summary of impacts to participants in the shark fishery and fishing dependent communities, including measures taken to minimize adverse social and economic effects and to provide for the sustained participation in the shark fishery. Based on the foregoing assessment and referenced sections of this FEIS, NMFS has determined that the FEIS would have the following impacts on participants in affected fisheries.

##### *Summary of Impacts*

As explained in Chapters 3 and 4, this amendment could impact the 502 directed and incidental shark permit holders and 106 federally permitted shark dealers through SCS quota reductions. In addition, an estimated 223 fishermen could be affected by the inclusion of smooth dogfish under federal management. Many of the current shark permit holders would also be affected by smooth dogfish management measures as many federal shark fishermen currently fish for smooth dogfish but are not required to hold a federal permit in order to retain them. NMFS does not anticipate large, negative socioeconomic impacts on a large number of fishermen and fishing communities as a result of the measures in this amendment as NMFS would allow gillnets to continue to be an authorized gear for Atlantic sharks, and recreational fishermen would continue to be allowed to retain blacknose sharks. Finally, since there were no recommendations for shortfin mako adopted at ICCAT in 2009, there are no regulatory changes for this species at this time, and thus, no anticipated impacts to pelagic shark fishermen. Future social and economic impacts would be dependent on measures adopted through international fisheries management organizations, such as ICCAT.

Due to SCS quota reductions, this amendment could impact communities dependent on the SCS fishery, such as entities that deal with the processing and sale of SCS products. The communities most likely affected are mentioned above. Quota reductions could translate into negative socioeconomic impacts due to reduced revenues as well as changes in fishing practices as fishermen and entities dealing with shark products (*i.e.*, dealers and processors) would have to switch to other fisheries once the reduced SCS quotas are met to make up for lost revenues in the SCS fishery. Based on state landings, the SCS fishermen that would be affected by this

amendment are primarily located in Florida, North Carolina, South Carolina, and Alabama whereas most of the shark dealers are located in Florida.

In addition, besides a permit requirement for smooth dogfish, federal smooth dogfish permit holders would be prohibited from processing smooth dogfish at sea and would be required to offload smooth dogfish with all their fins naturally attached. This would be a change to how the fishery is currently prosecuted, resulting in negative socio-economic impacts as it may increase handling time of smooth dogfish once the fishing vessel is dockside and could change how smooth dogfish product is processed and stored. Increased dockside processing time could also lead to conflicts among user groups. The primary smooth dogfish fishery is currently located from North Carolina to New Jersey with a large concentration of smooth dogfish fishermen in North Carolina and Virginia. NMFS anticipates these communities would experience the largest impacts from this amendment.

#### *Minimization of Adverse Impacts*

NMFS minimized adverse impacts to fishermen and fishing communities by increasing the proposed SCS quotas from the DEIS to the FEIS based on revised data and public comment and analyses indicating fishermen could effectively target certain shark species while minimizing bycatch of blacknose sharks. While NMFS has increased the proposed SCS quotas, NMFS has also proposed a framework action that would allow NMFS to reduce the non-blacknose SCS and blacknose quotas, as appropriate, if blacknose shark discards become too high or if the status of the species changes. In addition, based on public comment regarding fishermen's ability to target certain species of sharks, in the FEIS, NMFS changed its preferred alternative from B3 to B1, which would continue to allow gillnet gear as an authorized gear for sharks. These measures would allow blacknose sharks to rebuild while minimizing adverse impacts to fishermen and fishing dependent communities.

As for smooth dogfish, NMFS increased the proposed quota for smooth dogfish between the DEIS and FEIS to account for the uncertainty in current landings of smooth dogfish, given fishermen and dealers are not required to report smooth dogfish landings at this time and public comment indicating the proposed quota would result in closures. In addition, NMFS has chosen to delay implementation of the smooth dogfish measures until the beginning of the 2012 fishing season. This delay would allow NMFS to consider and evaluate implications of the final smooth dogfish BiOp, have additional discussions with fishery participants regarding the fins attached requirement, and implement the permit requirements.

#### *Effects on Domestic Fishermen*

Typically, the main driver for the United States and international shark fisheries is the fins of large coastal sharks. The fins of SCS and smooth dogfish have a relatively low value compared to other shark species, and therefore, are used more for domestic product. However, smooth dogfish meat is often exported. Thus, in order to not disadvantage domestic fishermen in relation to foreign competitors, NMFS is delaying the implementation of the smooth dogfish management measures until the beginning of the 2012 fishing season in order to have additional discussions with fishery participants regarding the fins attached requirement for smooth dogfish. In addition, for shortfin mako sharks, which do have an international fishery component, NMFS

is specifically taking a multilateral approach to end overfishing of shortfin makos where other nations that contribute to shortfin mako mortality can also help end overfishing of this species, thus not disadvantaging U.S. fishermen.

### *Social Impact Assessment*

This amendment conforms to the following guidelines for social impact assessments (as outlined above):

- NMFS describes the demographic characteristics of the fishery-related work force residing in communities affected by fishery management in Chapter 6 of the 2008 SAFE Report (NMFS, 2008). In particular, the demographic, income, and employment effects in relation to the work force as a whole by community and region are discussed in this chapter of the 2008 SAFE report. However, as smooth dogfish are not currently federally managed, community profiles have not been completed for the fishery-related work force residing in communities affected by federal management of smooth dogfish. The preferred alternative F2 in this amendment will act as the first step of permitting and identifying those communities that participate in the smooth dogfish fishery so that community profiles can be completed at a later date.
- The preferred SCS and smooth dogfish alternatives could change the cultural issues of attitudes, beliefs, and values of fishermen, fishery-related workers, other stakeholders, and their communities if fishermen choose to leave the SCS and/or smooth dogfish fisheries as a result of the management measures in this amendment, particularly in areas such Fort Pierce, Florida, where shark gillnet fishermen rely heavily on SCS or in North Carolina to New Jersey where the primary smooth dogfish fishery occurs. Thus, SCS quota reductions and smooth dogfish management measures could have negative social impacts on fishermen, fishery-related workers, other stakeholders, and their communities. Reduced SCS quotas would translate into decreased revenues and potential changes in fishing behaviors as fishermen, fishery-related workers, other stakeholders, and their communities look to other fisheries to make up for lost revenues or decide to leave the fishery altogether. Unfortunately, as described in Section 4.9 of Chapter 4, many fisheries that shark fishermen also participate in are experiencing increased restrictions as well, which will make it difficult for fishermen to make up lost revenues resulting from new measures in this amendment. New management measures for the smooth dogfish fishery could result in increased handling and processing time, which could result in changes in fishing practices and time spent at the dock. If this creates conflicts with other user groups, then smooth dogfish fishermen could experience negative social impacts, such as deciding to leave the fishery or only fish for smooth dogfish in states waters where federal permits and other requirements are not required.
- The preferred SCS and smooth dogfish actions should not affect the social structure and organization, such as the ability to provided necessary social support and services for families and communities. However, due to the preferred

measures, if fishermen chose to leave the SCS or smooth dogfish fishery, there may be an increased need for social support and services for fishermen's families provided that they were unable to redirect effort into other fisheries.

- The preferred actions should not affect the non-economic social aspects of the proposed action, such as lifestyle issues, health and safety issues, and the non-consumptive and recreational use of living marine resources and their habitats. The proposed actions would affect commercial fishing practices; however, SCS quota reductions and smooth dogfish management measures should have no impacts on lifestyle or health and safety issues. In addition, the preferred measures for the recreational blacknose shark fishery does not change measures from the current status quo where the current federal minimum size of 54 inch FL creates a *de facto* retention prohibition of blacknose sharks in federal waters since blacknose sharks rarely reach a size greater than 54 inches. In addition, since no new measures were adopted for shortfin mako sharks during the 2009 ICCAT meeting, currently there are no changes to the recreational shortfin mako shark fishery. The other preferred management measure would encourage the release of shortfin mako sharks brought to fishing vessels alive; however, this would only encourage rather than require recreational fishermen to practice catch and release of shortfin mako sharks.
- The preferred action could affect the historical dependence on and participation in the fishery by fishermen and communities, reflected in the structure of fishing practices, income distribution, and rights. As mentioned above, reduced SCS quotas would translate into decreased revenues and potential changes in fishing behaviors and/or historical participation in the SCS fishery. In addition, new federal management measures for smooth dogfish could result in fishermen leaving the smooth dogfish or choosing to fish for smooth dogfish in only state waters. These changes could result in lost revenues and negative social impacts as fishermen would have to look to other fisheries to make up for lost revenues or leave the SCS and/or smooth dogfish fisheries altogether.

## Chapter 9 References

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**CHAPTER 10 TABLE OF CONTENTS**

**Chapter 10 Table of Contents..... 10-i**  
**10.0 Other Considerations..... 10-1**  
10.1 National Standards ..... 10-1  
10.2 Consideration of Magnuson-Stevens Section 304(g) Measures ..... 10-7



## **10.0 OTHER CONSIDERATIONS**

### **10.1 National Standards**

This chapter provides analyses demonstrating that the measures in Amendment 3 to the HMS FMP is consistent with the National Standards (NS), 16 U.S.C. §1851(a)(1)-(10) of the Magnuson-Stevens Act as implemented by the National Standard Guidelines (NSG1) set forth in the 50 CFR part 600 regulations. The following descriptions are a summary of how the preferred alternatives are consistent. More information can be found in earlier chapters.

NS 1 requires NMFS to prevent overfishing while achieving, on a continuing basis, OY from each fishery for the U.S. fishing industry. As summarized in other chapters, over the past several years, NMFS has undertaken numerous management actions, including the 2006 Consolidated HMS FMP and Amendments 1 and 2 to the 2006 Consolidated HMS FMP, to address overfishing and to rebuild HMS stocks. The preferred alternatives in this document are consistent, to the greatest extent practicable, with ongoing management efforts to rebuild, manage, and conserve target species in accordance with NS1, NSG1 and 16 U.S.C. §1854(e)(4).

- The Magnuson-Stevens Act requires FMPs to include a mechanism for specifying ACLs and AMs for all fisheries. For stocks that were determined to be overfished before July 12, 2009, ACLs and AMs must be established before the 2010 fishing year; for all other species or complexes, ACLs and AMs must be established no later than 2011. The 2006 Consolidated HMS FMP does not presently include such a mechanism or a practice of specifying annual ACLs and AMs for Atlantic sharks. Therefore, the 2006 Consolidated HMS FMP needs to be amended for Atlantic sharks to meet this requirement by the statutory deadline. This amendment develops an appropriate mechanism for specifying ACLs to prevent and end overfishing within the constraints of existing data and annually set ACLs and apply AMs to ensure that ACLs are not exceeded.
- The preferred commercial SCS alternative A6 is consistent with NS 1 because it implements mortality reductions consistent with the 2007 SCS stock assessments to end overfishing and rebuild the blacknose shark stock. This alternative would establish a separate blacknose shark quota and non-blacknose SCS quota and, in combination with the other SCS alternatives, would meet the OY for blacknose sharks along with rebuilding the stock. While the overall quota for non-blacknose SCS would decrease since those species are sometimes caught in the same manner as blacknose sharks, because the quota would be established equal to average landings of those species, the actual landings should not decrease. Additionally, if fishermen show they can actively avoid blacknose sharks while targeting the other SCS, NMFS may increase the non-blacknose SCS quota accordingly to further increase the opportunity to land OY for all SCS. The decreased quota for blacknose sharks will end overfishing and rebuild the stock.
- The recreational SCS preferred alternative D1, maintaining the status quo with respect to retention and size limits, would continue to prevent the retention of the vast majority of recreationally caught blacknose sharks. The species rarely reaches the 54 inch minimum size.

- The commercial gear restrictions preferred alternative B1, maintaining the status quo with respect to gillnets in the shark fishery, is consistent with NS1. Although the preferred alternative in the FEIS is different than that in the DEIS, allowing gillnets to be used in the South Atlantic, in conjunction with the preferred alternative A6, should still stop overfishing of blacknose sharks and allow the stock to rebuild within the required timeframe. Based upon public comment, NEFSC and SEFSC input, and NMFS analyses, it was found that gillnets catch a larger-sized blacknose shark than other gears and can selectively target species within the SCS complex. These two findings resulted in a change to the preferred alternative. Catching a few larger-sized, mature individuals should be less damaging to the blacknose shark stock than catching many, smaller-sized (often immature) individuals. The apparent ability to avoid blacknose sharks should offer the necessary protection of the species while mitigating negative economic impacts to non-blacknose SCS fishermen. Thus, the preferred alternative B1 is consistent with both rebuilding goals and NS 1.
- Consistent with NS 1, the domestic commercial and recreational pelagic shark preferred alternatives (C5, C6, E3, and E4) to promote live release of shortfin mako in conjunction with existing management measures while also working internationally to prevent overfishing should reduce overfishing of the shortfin mako shark. This species has an Atlantic-wide distribution, and U.S. landings are a small percentage of the total international landings. The U.S. cannot unilaterally contribute to substantial reduction to or an end to overfishing of this stock through domestic management measures. Therefore, working at the international level to develop management measures for other nations to adopt would support ending overfishing of shortfin mako sharks. Domestically, encouraging the live release of shortfin mako sharks would help reduce the mortality within U.S. waters. In November 2009, at the Twenty-First regular meeting of ICCAT in Recife, Brazil, the United States submitted a proposal that included measures to conserve shortfin mako sharks, including a measure to cap shortfin mako landings at 2008 levels. The proposal was not adopted, due to differences of opinion among contracting parties as some wanted to exempt shortfin mako sharks taken as bycatch from the proposal. Bycatch of shortfin mako sharks in the pelagic longline fishery is the leading cause of mortality in the ICCAT Convention area, thus this counterproposal was not acceptable. The United States advocated continued consideration of shortfin mako shark measures and its proposal was referred for consideration at the 2010 Annual ICCAT meeting.
- The preferred alternative for smooth dogfish (alternative F2) is consistent with NS 1 as it would provide federal management of the species and allow NMFS to establish an Optimum Yield for the species while preventing overfishing. The management measures would require a federal permit for commercial and recreational fishermen in order to fish for and retain smooth dogfish in federal waters. In addition, it would implement a commercial quota for this species at a level that could prevent overfishing. These measures should minimize changes to how the fishery is currently prosecuted while helping to characterize the fishery and identify its participants. Beyond the new federal permit, associated quota, and fins naturally attached requirement, no new restrictions would be placed on the fishery.

NS 2 requires that conservation and management measures be based on the best scientific information available. The preferred alternatives in this document are consistent with NS 2

guidelines.

- The preferred commercial and recreational SCS alternatives (A6 and D1) are consistent with NS2 because they are based on the latest SCS stock assessments. This stock assessment followed the SEDAR process, including a peer review. Results from the 2007 SCS stock assessments represent the best available science.
- The commercial gear restrictions preferred alternative B1, maintaining the status quo with respect to gillnets in the shark fishery, is consistent with NS2. NMFS used the best available data in terms of dealer reports, observer reports, and logbook data to analyze the impacts associated with the commercial gear restrictions alternatives. It was found that the continued use of gillnets in the South Atlantic shark fishery is consistent with rebuilding goals because gillnets catch a larger-sized blacknose shark than other gears and can selectively target species within the SCS complex.
- Consistent with NS2, the commercial and recreational shortfin mako shark preferred alternatives (C5, C6, E3, and E4) are based on the latest SCRS stock assessment for shortfin mako sharks. This stock assessment followed the same process used for other ICCAT managed stocks and results from this stock assessment represent the best available science.
- The preferred alternative for smooth dogfish management measures (F2) is consistent with NS2. Due to the lack of previous federal management, data regarding catch levels and the number of participants in the fishery are sparse. Quotas established within this preferred alternative are based upon the best available landings data from VTR, logbook, and ACCSP data. While these data are not robust, they constitute the best scientific information available at this time.

NS 3 requires that, to the extent practicable, an individual stock of fish be managed as a unit throughout its range and interrelated stocks of fish be managed as a unit or in close coordination. The preferred alternatives in this document are consistent with this NS.

- The preferred commercial and recreational SCS alternatives (A6 and D1) are consistent with NS3 as blacknose sharks would be managed throughout their ranges to the extent of federal jurisdiction from Virginia through the Gulf of Mexico.
- The commercial gear restrictions preferred alternative (B1) is consistent with NS3 as it would not alter current shark gillnet regulations and would not alter the geographic scope of management.
- The shortfin mako shark range extends beyond U.S. waters. NMFS would work with other nations at the international level to establish appropriate management measures to reduce fishing pressure on shortfin mako sharks across its range. As such, the commercial and recreational shortfin mako shark preferred alternatives (C5, C6, E3, and E4) are consistent with NS3.
- The smooth dogfish shark range extends beyond U.S. waters. The preferred alternative for smooth dogfish management measures (F2) is consistent with NS3 because it manages the species throughout its range in U.S. federal waters from Maine to Texas, including the

Caribbean. The alternative would also apply to federally permitted vessels fishing on the high seas. Federal permit requirements and quotas would apply to all shark fishermen wanting to retain smooth dogfish in these areas.

NS 4 requires that conservation and management measures do not discriminate between residents of different states. Furthermore, if it becomes necessary to allocate or assign fishing privileges among various U.S. fishermen, such allocation should be fair and equitable to all fishermen; be reasonably calculated to promote conservation; and should be carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges. The preferred alternatives in this document are consistent with this NS.

- The commercial SCS effort control preferred alternative A6 would apply to all fishermen in the Atlantic, Gulf of Mexico, and the Caribbean Sea. While the resulting quotas may disadvantage shark fishermen living in particular areas off Florida because they are the main fishermen targeting blacknose sharks, the quota is justified under NS 4 as a conservation measure to prevent overfishing and rebuild blacknose sharks and has no discriminatory intent. Furthermore, the quota applies to all shark fishermen, so fishermen from all states would be subject to the same restrictions.
- The commercial gear restrictions preferred alternative B1, maintaining the status quo with respect to gillnets in the shark fishery, would not alter current authorized gears and therefore does not discriminate between resident of different states.
- The recreational SCS preferred alternative D1 and the recreational and commercial pelagic shark preferred alternatives (C5, C6, E3, and E4) apply to the entire U.S. EEZ within the Atlantic, Gulf of Mexico, and the Caribbean Sea. Therefore, these measures do not discriminate between residents of different states, nor do they allocate fishing privileges and are consistent with NS4.
- The smooth dogfish management preferred alternative (F2), which entails a federal smooth dogfish permit and quota, is consistent with NS4 because it is an open access permit and does not allocate fishing privileges. Additionally, the measure would apply in the entire U.S. EEZ within the Atlantic, Gulf of Mexico, and Caribbean, and would not discriminate between residents of different states.

NS 5 requires that conservation and management measures should, where practicable, consider efficiency in the utilization of fishery resources with the exception that no such measure shall have economic allocation as its sole purpose. The preferred alternatives in this document are consistent with this NS.

- Consistent with NS 5, the conservation and management measures in both the commercial SCS and commercial gear restrictions preferred alternatives (A6 and B1) were analyzed for changes in the efficiency of utilization of the fishery resource. Reductions in the blacknose shark quota would lead to a significant reduction in blacknose shark harvest and could result in a decrease in efficiency of harvesting other SCSs. However, reducing the blacknose shark quota would help prevent overfishing of the species and these impacts would be mitigated by maintaining a high non-blacknose SCS quota. The non-blacknose

SCS quota will allow the fishery to continue at its average landings level. Additionally, if fishermen show they can actively avoid blacknose sharks while targeting the other SCS, NMFS may increase the non-blacknose SCS quota accordingly to further increase the opportunity to land OY for all SCS. Consistent with NS 5, neither of these preferred alternatives has economic allocation as their sole purpose.

- The preferred alternative for the SCS recreational measures (D1) would maintain the current retention and size limit, and would not alter efficiencies in the recreational fishery. Consistent with NS 5, this preferred alternative does not have economic allocation as its sole purpose.
- Both the commercial and recreational pelagic shark preferred alternatives (C5, C6, E3, and E4) were analyzed for changes in the efficiency in the utilization of the fishery resource, consistent with NS 5. Encouraging the live release of shortfin mako sharks within the commercial and recreational fisheries will purposefully not impact the efficiency of fishery resource extraction. Measures promoted at the international level would similarly work to reduce fishing pressure, but likely maintain a certain level of catch. Consistent with NS 5, neither of these preferred alternatives have economic allocation as their sole purpose.
- Establishing federal management measures for smooth dogfish (preferred alternative F2) would minimize changes to the efficiency of utilization of the fishery resource, consistent with NS 5. The preferred alternative would require a permit for fishermen fishing for smooth dogfish in federal waters and establish a commercial quota. The smooth dogfish fishery would remain an open access fishery with no new gear restrictions. Beyond the permit requirement and quota, the requirement to maintain smooth dogfish with fins naturally attached through offloading is the only change. Setting a quota and establishing a permit system could affect the efficiency of the current fishery in the short-term, but provide for the long-term efficient management of the fishery as it matures. Although requiring fins remain naturally attached could affect the efficiency of utilization, it already exists in other shark fisheries where new methods have been developed. The implementation of smooth dogfish management measures will be delayed until the 2012 fishing season, in part, to allow these techniques to be adopted in the smooth dogfish fishery, thereby maintaining efficiency. Consistent with NS 5, this preferred alternative does not have economic allocation as its sole purpose.

NS 6 states that conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches. The preferred alternatives in this document are consistent with this NS.

- Each of the preferred alternatives (A6, B1, C5, C6, D1, E3, E4, and F2) implements measures that consider the variations among, and contingencies in, fisheries, fishery resources, and catches. The preferred measures relate to either fishing effort/retention restrictions, including the recreational and commercial pelagic shark preferred alternatives, or quotas, as is in the case of the commercial blacknose shark and the smooth dogfish fisheries. When preferring these management measures, NMFS analyzed the data considering variations among the fisheries, fishery resources, and catches. Measures are already in place to ensure quotas are not exceeded in the presence of variations in the

fishery and catches; however, quotas could change in the future if warranted by new stock assessments or as outlined in the framework for alternative A6. Timely reporting of catch data and the requirement to close the fishery after 80 percent of the quota utilized would allow for these measures to adjust to variations and contingencies, consistent with NS 6.

NS 7 states that conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication. The preferred alternatives in this document are consistent with this NS.

- The costs associated with most of the preferred alternatives (A6, B1, C5, C6, D1, E3, and E4) are minimal as they would implement measures restricting fishing effort and/or retention. The only preferred alternative to have an associated cost is the establishment of a smooth dogfish federal permit (alternative F2). A minimal fee would be required upon applying for the permit, but would not introduce a significant barrier to the fishery. Consistent with NS 7, the preferred alternatives were analyzed to avoid unnecessary duplication.

NS 8 states that conservation and management measures shall, consistent with the conservation requirements of the Magnuson-Stevens Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to provide for the sustained participation of such communities, and to the extent practicable, minimize adverse economic impacts on such communities. The preferred alternatives in this document are consistent with this NS.

- The preferred alternatives (A6, B1, C5, C6, D1, E3, and E4) are necessary to allow rebuilding and end overfishing of blacknose sharks consistent with NS 1. There are moderate social and economic impacts associated with the preferred alternatives to reduce blacknose shark mortality (A6, B1, and D1), however, NMFS mitigated these impacts by developing a preferred alternative which, if chosen and implemented, would maintain a non-blacknose SCS quota equal to the average annual landings. The non-blacknose SCS quota will allow the fishery to continue near its current landings level. Additionally, preferred alternative B1 will maintain the status quo for commercial gears, further mitigating negative impacts though the continued use of gillnets in the shark fishery.
- The preferred alternative for the SCS recreational measures (D1) would maintain the current retention and size limit, and would not impact fishing communities.
- Encouraging the live release of shortfin mako sharks in both the recreational and commercial fisheries (preferred alternatives C6 and E4) would still allow for retention and will not change the regulations. Preferred alternatives C5 and E3, taking action at the international level, could result in international efforts to decrease the catch of short mako sharks, but it would be unlikely to prohibit the retention of the species.
- The smooth dogfish permit (preferred alternative F2) would be open access and should not create any significant barriers to entering or remaining in the fishery. NMFS recognizes that requiring fins to remain naturally attached to the carcass through offloading differs from current practices in the fishery, and therefore plans to delay implementation until 2012 to allow the fishery time to modify processing practices. This additional time should allow smooth dogfish fishermen to adopt techniques used in other shark fisheries or to

develop new methods.

NS 9 states that conservation and management measures shall, to the extent practicable, minimize bycatch, and to the extent that bycatch cannot be avoided, minimize the mortality of such bycatch. The preferred alternatives in this document are consistent with this NS.

- Consistent with NS 9, the conservation and management measures in both the commercial SCS and commercial gear restrictions preferred alternatives (A6 and B1) minimize bycatch. Data currently available indicate relatively low rates of bycatch and bycatch mortality of protected species and other finfish in the SCS gillnet fishery compared to other HMS fisheries. Allowing fishermen to use gillnets to target non-blacknose SCS would likely reduce bycatch relative to other gear types. Furthermore, the SCS quota will be adjusted based upon how successful fishermen are at avoiding blacknose sharks. If blacknose shark bycatch levels remain low, the non-blacknose SCS quota will remain high. If catch data shows that fishermen cannot avoid blacknose shark bycatch, the non-blacknose SCS quota will decrease. This quota framework offers an incentive to non-blacknose SCS fishermen to avoid bycatch. For these reasons, both the commercial SCS and commercial gear restrictions preferred alternatives (A6 and B1) are consistent with NS9.
- The recreational SCS preferred alternative (D1) to maintain the current retention and size limit in the recreational fishery does not directly address bycatch reduction, as it is the No Action alternative. Management measures currently in place would continue to address bycatch and reduce it the extent practicable.
- The commercial and recreational shortfin mako shark preferred alternatives (C5, C6, E3, and E4) to take action at the international level and to encourage the live release of the species, including when caught incidentally, would minimize mortality. Encouraging the live release of shortfin mako sharks would have an impact in the short term, while international efforts offer the strongest protection for the species, including when incidentally caught, due to the low U.S. contribution to Atlantic-wide catch.
- The smooth dogfish preferred alternative (F2) does not directly address bycatch reduction; however, it is unlikely that these measures would increase bycatch. Management measures currently in place would continue to address bycatch and reduce it the extent practicable.

NS 10 states that conservation and management measures shall, to the extent practicable, promote the safety of human life at sea. The preferred alternatives in the document are consistent with this NS.

- No impact to safety of life at sea is anticipated to result from these preferred alternatives (A6, B1, C5, C6, D1, E3, E4, and F2). The management measures in the preferred alternatives would not require fishermen to travel greater distances, fish in bad weather, or otherwise fish in an unsafe manner.

## **10.2 Consideration of Magnuson-Stevens Section 304(g) Measures**

Section 304(g) of the Magnuson-Stevens Act sets forth requirements specific to the preparation and implementation of an FMP or FMP amendment for HMS. See 16 U.S.C.

1854(g) for full text. The summary of the requirements of Section 304(g) and an explanation of how NMFS is consistent with these requirements are below. The impacts of the preferred alternatives and how it meets these requirements are described in more detail in Chapters 2 and 4 of the document. This section provides only a summary of how each of the requirements is met.

*1. Consult with and consider the views of affected Councils, Commissioners, and advisory groups*

NMFS published a Notice of Intent on May 7, 2008 (73 FR 25665) announcing the intent to initiate an amendment to the 2006 Consolidated HMS FMP. On July 2, 2008 (73 FR 37932), NMFS published a Notice of Availability to inform the public of the issues and options presentation that was available on the HMS website. This Notice also announced NMFS' intent to hold five public scoping meetings to discuss and collect comments on issues described in the presentation. A Predraft of Amendment 3 to the 2006 Consolidated HMS FMP (Amendment 3) was developed and released to consulting parties and HMS Advisory panel (AP) members in February 2009. NMFS presented the Predraft to the HMS AP members at the February 2009 AP meeting to discuss and receive comments. Written comments received on the issues and options presentation, during the scoping meetings, and at the HMS AP meeting were considered in the preparation of the DEIS for Amendment 3 (July 24, 2009, 74 FR 36892). Comments received on the DEIS from public submissions, public hearings, the HMS AP September 2009 meeting, and presentations to the five Atlantic Regional Fishery Management Councils were used in the preparation of this document.

*2. Establish an advisory panel for each FMP*

As part of the 2006 Consolidated HMS FMP, NMFS combined the Atlantic Billfish and HMS APs into one panel. This combined HMS AP provided representation from the commercial and recreational fishing industry, academia, non-governmental organizations, state representatives, representatives from the Regional Fishery Management Councils, and the Atlantic and Gulf States Marine Fisheries Commissions. This amendment will not change the HMS AP, and NMFS convened meetings of the HMS AP during the public comment period of both the Predraft and DEIS of Amendment 3 to discuss and collect comments and proposed shark management measures.

*3. Evaluate the likely effects, if any, of conservation and management measures on participants in the affected fisheries and minimize, to the extent practicable, any disadvantage to U. S. fishermen in relation to foreign competitors.*

Throughout this document, NMFS has described the effects of the management measures and any impacts on U. S. fishermen. Chapter 9 in Section 9.4 also gives an overview of the fisheries impacts of the preferred management measures in the Final Fisheries Impact Statement. The preferred alternatives in this document are necessary to meet Magnuson-Stevens Act mandates to rebuild overfished stocks and prevent overfishing, which in the long-term are not expected to disadvantage U.S. fishermen in relation to foreign competitors. Because the United States contribution to the total fishing mortality of shortfin mako sharks in the North Atlantic is less than 10 percent, the preferred alternative for shortfin mako sharks would not change domestic regulations but would look to establish international management measures to end overfishing on an international level. In addition, NMFS is delaying the implementation of the smooth dogfish management measures until the beginning of the 2012 fishing season in order to have additional discussions with fishery participants regarding the fins attached requirement for

smooth dogfish, which should ensure that domestic fishermen are not disadvantaged in relation to foreign competitors with respect to exports of smooth dogfish product.

4. *With respect to HMS for which the United States is authorized to harvest an allocation, quota, of fishing mortality level under a relevant international fishery agreement, provide fishing vessels with a reasonable opportunity to harvest such allocation, quota, or at such fishing mortality level.*

There is currently no international agreement on blacknose shark, or smooth dogfish quotas, allocations, or fishing mortality levels. Therefore, this requirement is not applicable for these species. However, shortfin mako sharks are managed both domestically and internationally at ICCAT. Because of the small U.S. contribution to Atlantic shortfin mako shark mortality, domestic reductions on shortfin mako shark mortality would not end overfishing of the entire North Atlantic stock. Therefore, NMFS believes that ending overfishing and preventing an overfished status would be better accomplished through international action where other countries that have large takes of shortfin mako sharks could participate in mortality reduction discussions.

5. *Review on a continuing basis, and revise as appropriate, the conservation and management measures included in the FMP.*

NMFS continues to review the need for any revisions to the existing regulations for HMS. Final Amendment 3 to the 2006 Consolidated HMS FMP is the culmination of one of those reviews.

6. *Diligently pursue, through international entities, comparable international fishery management measures with respect to HMS.*

NMFS continues to work with the ICCAT and other international entities such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), to implement comparable international fishery management measures. To the extent that some of the management measures in this amendment are exportable, NMFS works to provide foreign nations with the techniques and scientific knowledge to implement similar management measures.

7. *Ensure that conservation and management measures under this subsection:*
  - a. *Promote international conservation of the affected fishery;*
  - b. *Take into consideration traditional fishing patterns of fishing vessels of the United States and the operating requirements of the fisheries;*
  - c. *Are fair and equitable in allocating fishing privileges among United States fishermen and do not have economic allocation as the sole purpose; and*
  - d. *Promote, to the extent practicable, implementation of scientific research programs that include the tagging and release of Atlantic HMS.*

All of the objectives of the document indicate how NMFS promotes the international conservation of the affected fisheries in order to obtain optimum yield while maintaining traditional fisheries and fishing gear and minimizing economic impacts on U.S. fishermen. The management measures in the preferred alternatives in this document are expected to meet these

goals.

## CHAPTER 11 TABLE OF CONTENTS

<b>Chapter 11 Table of Contents</b> .....	<b>11-i</b>
<b>Chapter 11 List of Figures</b> .....	<b>11-ii</b>
<b>11.0 Life History Accounts and Essential Fish Habitat Descriptions</b> .....	<b>11-1</b>
11.1 Habitat.....	11-1
11.2 Shark.....	11-2
11.2.1 Smooth Dogfish .....	11-2
11.2.2 Methodology for Determining Smooth Dogfish EFH .....	11-3
<b>Chapter 11 References</b> .....	<b>11-6</b>

## CHAPTER 11 LIST OF FIGURES

Figure 11.1	Smooth dogfish observations from fisheries independent surveys.....	11-4
Figure 11.2	Smooth dogfish EFH designation based on fisheries independent surveys.....	11-5

## **11.0 LIFE HISTORY ACCOUNTS AND ESSENTIAL FISH HABITAT DESCRIPTIONS**

### **11.1 Habitat**

Section 303(a)(7) of the Magnuson-Stevens Act, 16 U.S.C. §§ 1801 *et seq.*, requires FMPs to describe and identify EFH, minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat. The Magnuson-Stevens Act defines EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity.” (16 U.S.C. § 1802 (10)).

The EFH regulations require that EFH be described and identified within the U.S. EEZ for all life stages of each species in a fishery management unit. FMPs must describe EFH in text, tables, and figures that provide information on the biological requirements for each life history stage of the species. According to the EFH regulations, an initial inventory of available environmental and fisheries data sources should be undertaken to compile information necessary to describe and identify EFH and to identify major species-specific habitat data gaps. Habitats that satisfy the criteria in the Magnuson-Stevens Act have been identified and described as EFH in the 1999 FMPs and in Amendment 1 to the 1999 Tunas, Swordfish, and Shark FMP and were updated in Amendment 1 to the 2006 Consolidated HMS FMP.

NMFS originally described and identified EFH and related EFH regulatory elements for all HMS in the management unit in the 1999 FMPs, which were updated in Amendment 1 to the 1999 Tunas, Swordfish, and Shark FMP and implemented in 2003. The EFH regulations require NMFS to conduct a comprehensive review of all EFH related information at least once every five years and revise or amend the EFH boundaries if warranted. To that effect, NMFS undertook the comprehensive five-year review of information pertaining to EFH for all HMS in the management unit in the 2006 Consolidated HMS FMP. Based on the findings of this review, NMFS issued a Notice of Intent to amend EFH for HMS through Amendment 1 to the 2006 Consolidate HMS FMP on November 7, 2006 (71 FR 65087). In the Notice of Intent NMFS described its intent to prepare an Environmental Impact Statement (EIS) to examine alternatives for updating existing HMS Essential Fish Habitat (EFH), consider additional Habitat Areas of Particular Concern (HAPCs), analyze fishing gear impacts, and if necessary, identify ways to avoid or minimize, to the extent practicable, adverse fishing impacts on EFH consistent with the Magnuson-Stevens Act and other relevant federal laws. At that time, NMFS requested new information not previously considered in the 2006 Consolidated HMS FMP, comments on potential HAPCs, and information regarding potential fishing and non-fishing impacts that may adversely affect EFH.

On June 12, 2009, NMFS published a Notice of Availability of the Final Environmental Impact Statement for Amendment 1 to the 2006 Consolidated HMS FMP for Essential Fish Habitat (EFH) (74 FR 28018). This amendment updated and revised EFH boundaries for HMS, designated a new HAPC for bluefin tuna in the Gulf of Mexico, and analyzed fishing and non-fishing impacts on EFH. To facilitate public outreach, an internet-based mapping program (HMS EFH Evaluation Tool) was created to show the updated and revised EFH boundaries for HMS. Currently, there is no EFH designated for smooth dogfish and, therefore, no specific

management measures exist to mitigate adverse impacts, if any, to such EFH from fishing. EFH designation for smooth dogfish is detailed below.

## 11.2 Shark

As discussed in chapters 2 and 4, EFH must be designated as a statutory condition of establishing federal management for any species. Thus, NMFS is proposing EFH for smooth dogfish in this amendment. Amendment 1 to the 2006 Consolidated HMS FMP extensively analyzed methods for determining EFH, and NMFS considers the conclusions in Amendment 1 to the 2006 Consolidated HMS FMP to be the best available science. As such, no alternatives were considered for designating EFH other than the method used in Amendment 1 to the 2006 Consolidated HMS FMP as explained below.

### 11.2.1 Smooth Dogfish

**Smooth Dogfish (*Mustelus canis*)** Smooth dogfish is a common coastal shark species found in the Atlantic Ocean from Massachusetts to northern Argentina. They are primarily demersal sharks that inhabit continental shelves and are typically found in inshore waters down to 200m depth (Compagno, 1984). Smooth dogfish is a migratory species that responds to changes in water temperature. They primarily congregate between southern North Carolina and the Chesapeake Bay in the winter. In the spring, smooth dogfish move along the coast when bottom water warms up to at least 6 to 7°C. As temperatures get colder, smooth dogfish move offshore to their wintering areas (Compagno, 1984). Smooth dogfish have diets that are dominated by invertebrates (Scharf *et al.*, 2000). They primarily feed on large crustaceans, consisting mostly of crabs (Gelsleichter *et al.*, 1999), but also rely heavily on American lobsters. In the New England waters during the spring, smooth dogfish feed on small bony fish, including menhaden, stickleback, wrasses, porgies, sculpins, and puffers (Compagno, 1984).

**Taxonomy:** Emerging molecular and morphological research has determined that Florida smoothhounds have been misclassified as a separate species from smooth dogfish (Jones, pers. comm.). Thus, NMFS is considering Florida smoothhounds and smooth dogfish as one species for the purpose of designating EFH.

**Reproductive potential:** The maximum size limit for smooth dogfish is 150 cm TL. Males mature at 2-3 years old (about 82 cm TL) and females mature between 4-7 years old, which is about 90 cm TL (Compagno, 1984; Conrath *et al.*, 2002). The length at 50 percent maturity for females is 102 cm TL, while males reach 50 percent maturity at 86 cm TL. Female smooth dogfish have an 11–12 month gestation period with mating occurring between May and September. The fecundity of smooth dogfish ranges between 3 and 18 pups per litter (Conrath and Musick, 2002). The size range at birth is between 28 and 39 cm (Rountree and Able, 1996). Marsh creeks may be particularly important to newborn smooth dogfish during June and July. Young-of-year (YOY) pups grow rapidly in these areas to a size of 55-70 cm TL, prior to migration from the estuaries by the end of October. The abundance of YOY within estuaries strongly suggests that estuaries are critically important nursery habitats for smooth dogfish within the Mid-Atlantic Bight (Rountree and Able, 1996).

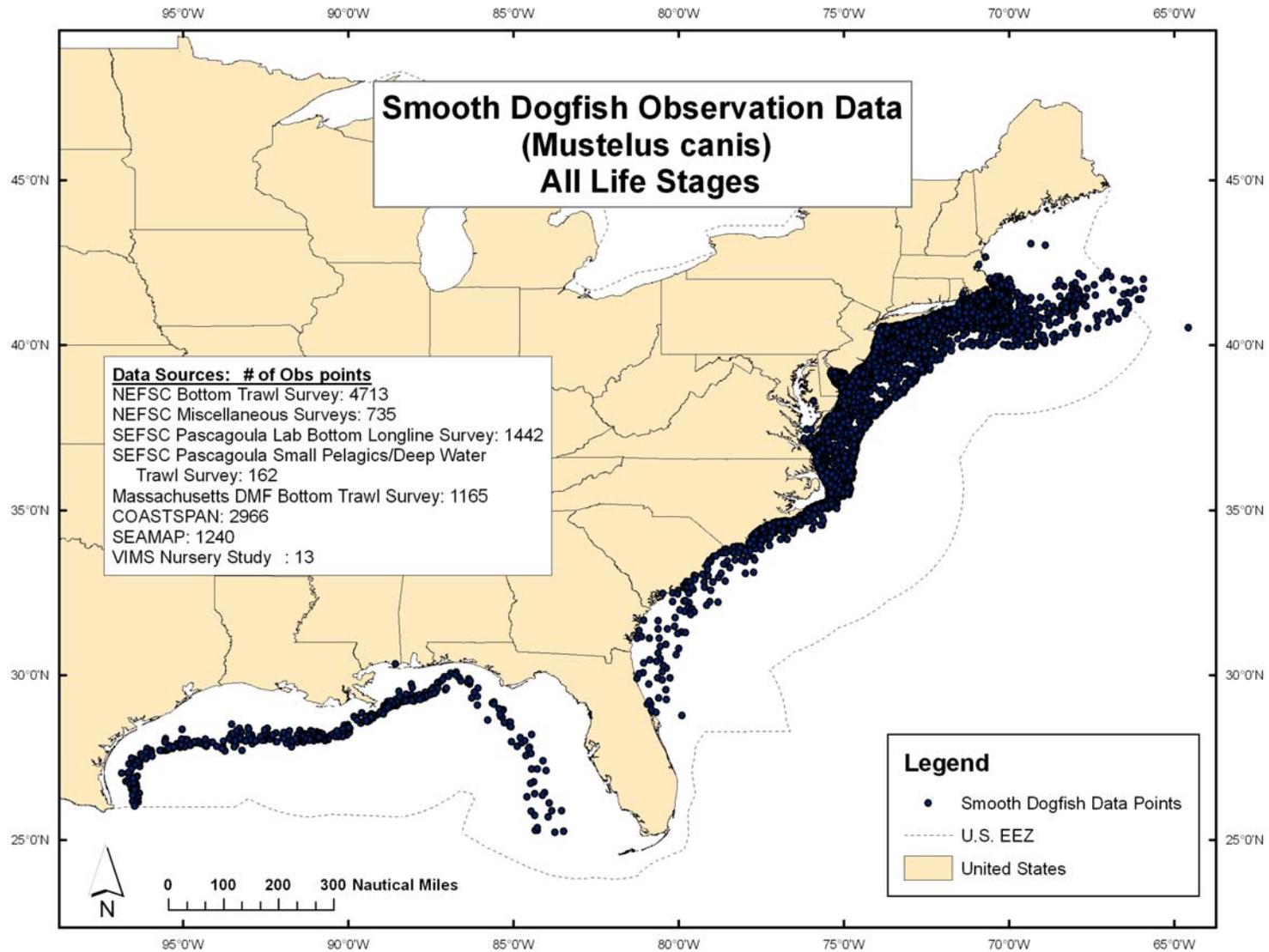
**Impact of fisheries:** Smooth dogfish are primarily caught in the northeast U.S. from Maine to South Carolina. They are primarily caught with gillnets, but are also captured in the longline fishery. Smooth dogfish are caught consistently throughout the year with peak catch rates in the late spring and early summer. According to the ACCSP, approximately 3,485,101 lb dw of smooth dogfish were landed from 2004-2007. The majority of these sharks were collected off the coast of North Carolina (1,796,867 lb dw). An average of about 213 vessels per year retained smooth dogfish according to VTR data, with an additional average of 10 vessels per year according to the Coastal Fisheries Logbook data, for a total estimate of 223 vessels per year that retain smooth dogfish. It is likely that less than a quarter of these vessels were directing effort on this species. This amendment would establish federal management.

#### ***Essential Fish Habitat for Smooth Dogfish:***

- **Neonate/YOY ( $\leq 59$  cm TL):** At this time, available information is insufficient for the identification of EFH for this life stage, therefore all life stages are combined in the EFH designation. Please refer to Figure 11.2 for detailed EFH map.
- **Juveniles (60 to 80 cm TL):** At this time, available information is insufficient for the identification of EFH for this life stage, therefore all life stages are combined in the EFH designation. Please refer to Figure 11.2 for detailed EFH map.
- **Adults ( $\geq 81$  cm TL):** At this time, available information is insufficient for the identification of EFH for this life stage, therefore all life stages are combined in the EFH designation. Please refer to Figure 11.2 for detailed EFH map.

#### **11.2.2 Methodology for Determining Smooth Dogfish EFH**

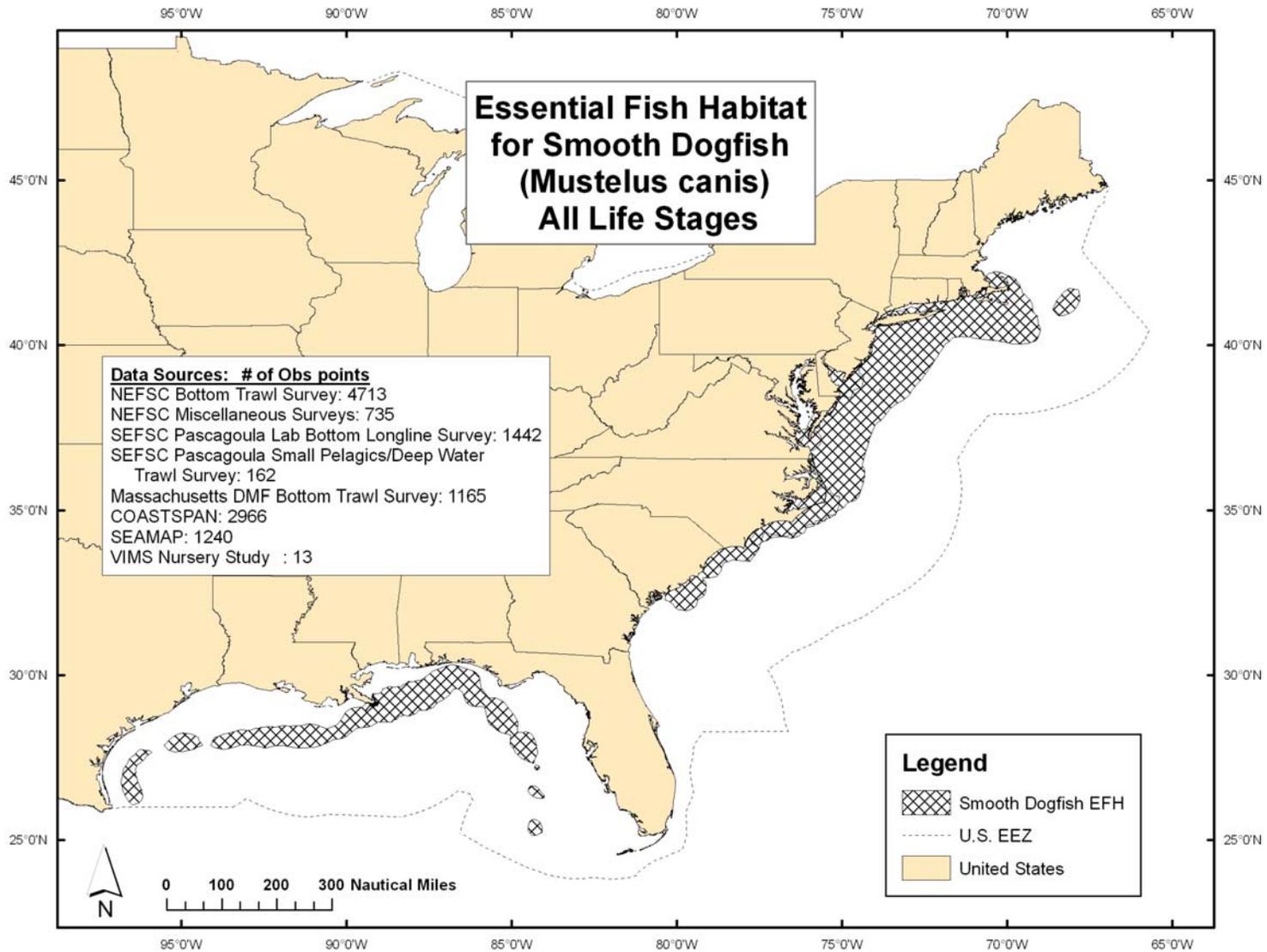
Smooth dogfish EFH boundaries are based on the 95 percent probability boundary using ESRI ArcGIS and Hawth's Analysis Tools ([www.spatial ecology.com](http://www.spatial ecology.com)) using data from fisheries independent surveys. The probability boundary was created by taking all of the available distribution points for the species at all life stage and creating a percent volume contour (PVC or probability boundary). A detailed description of the tool and the analytical approach used to create the boundary is provided in Amendment 1 to the 2006 Consolidated Atlantic HMS FMP. The probability boundary takes into account the distance between each point and the next nearest point, thereby excluding the least dense points (outliers) where the species occurred in relatively low numbers. The 95 percent probability boundary would include, on average, 95 percent of the points used to generate the probability boundary. Note that the specific EFH boundaries are the edited (*i.e.*, clipped) 95 percent probability boundaries. In some areas the 95 percent probability boundary overlapped with the shoreline due to buffers that are created while generating the probability boundaries. The EFH was further adjusted by including specific areas deemed important through a primary literature review.



**Figure 11.1**

**Smooth dogfish observations from fisheries independent surveys.**

Note: The map includes data points for smooth dogfish and Florida smoothhounds. Data sources: SEFSC, COASTSPAN, SEAMAP, VIMS Nursery Study



**Figure 11.2** Smooth dogfish EFH designation based on fisheries independent surveys.  
 Note: all life stages combined; Florida smoothhound data points were included in EFH designation for smooth dogfish.

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**CHAPTER 12 TABLE OF CONTENTS**

**Chapter 12 Table of Contents**..... **12-i**  
**Chapter 12 List of Tables**..... **12-ii**  
**12.0 List of Preparers** ..... **12-1**  
    12.1 List of Agencies, Organizations, and Persons Consulted and to Whom Copies of the  
        EIS Will Be Sent..... 12-1

**CHAPTER 12 LIST OF TABLES**

Table 12.1 Individuals that submitted written public comment for Draft Amendment 3 to the  
2006 Consolidated HMS FMP ..... 12-3

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The development of this rulemaking involved input from many people within NMFS, NMFS contractors, and input from constituent groups including the HMS AP. Staff from the HMS Management Division, in alphabetical order, who worked on this document include:

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- Other Divisions within the Office of Sustainable Fisheries (Alan Risenhoover and Emily Menashes);
- The Southeast Fisheries Science Center (Dr. Kate Andrews, Heather Balchowsky, Dr. John Carlson, Dr. Enric Cortés, Dr. William Driggers, Dan Foster, Walter Ingram, Lisa Jones, Dr. John Mitchell, Dr. Bonnie Ponwith, and Dr. Steve Turner);
- The Northeast Fisheries Science Center (Dr. Russell Brown, Dr. Nancy Kohler, Dr. Cami McCandless, Dr. Lisa Natanson, and Katherine Sosebee);
- The Southeast Regional Office of Protected Resources (David Bernhart, Steve Branstetter, Roy Crabtree, and Jenny Lee, Andrew Herndon);
- The Office of Law Enforcement (Jeff Radonski and Paul Raymond)
- NOAA General Counsel (Meggan Engelke-Ros, Scott Farley, Caroline Park, and Megan Walline); and;
- NMFS NEPA (Tammy Adams, Aileen Smith, and Steve Leathery).
- PPI/NOAA NEPA (Emily Johannes, Steve Kokkinakas)

### **12.1 List of Agencies, Organizations, and Persons Consulted and to Whom Copies of the EIS Will Be Sent**

Under 304(g)(1)(A) of the Magnuson-Stevens Act, NMFS is required to consult with affected Fishery Management Councils, ICCAT Commissioners and advisory groups, and the APs established under the Magnuson-Stevens Act regarding amendments to a FMP. As described below, NMFS provided documents and met with the consulting parties and to the

ASMFC and Gulf States Marine Fisheries Commission at various stages throughout the process. Hard copies and/or CDs of these documents were also provided to anyone who requested copies.

NMFS announced its intent to prepare an EIS on May 7, 2008 (73 FR 25665). In this notice, NMFS asked for comments on existing commercial and recreational shark management measures that would assist the Agency in determining options for conservation and management of Atlantic sharks consistent with relevant federal statutes. On July 2, 2008 (73 FR 37932) and September 13, 2008 (73 FR 53407), NMFS announced the availability of a scoping document and five scoping meetings were held from July through September 2008. During the scoping meetings, NMFS described the results of recent stock assessments, issues that need to be addressed concerning shark management, and options or alternatives that may be implemented to achieve objectives.

NMFS released a Predraft of Amendment 3 to the 2006 Consolidated HMS FMP and a summary of the scoping comments to the HMS AP in February 2009. This document was also put on the HMS website. NMFS requested that the HMS AP and consulting parties (New England, Mid-Atlantic, South Atlantic, Gulf, and Caribbean Fishery Management Councils, Marine Fisheries Commissions, U.S. Coast Guard, and other State and Federal Agency representatives) submit comments on the Predraft by March 16, 2009. The Predraft was presented to the Gulf of Mexico (73 FR 58567), South Atlantic (73 FR 50781), Mid-Atlantic (73 FR 56804), Caribbean (73 FR 43691), and New England (73 FR 54790) Fishery Management Councils. While some of the options changed between the Predraft and draft stages of Amendment 3 to the 2006 Consolidated HMS FMP, the overall list of issues to be addressed has not changed. A summary of the comments received during scoping (May 7, 2008 to November 14, 2008) can be found on the HMS website: [http://www.nmfs.noaa.gov/sfa/hms/newslst/2009/02-12-09\\_Predraft\\_for\\_Amendment\\_3.pdf](http://www.nmfs.noaa.gov/sfa/hms/newslst/2009/02-12-09_Predraft_for_Amendment_3.pdf). A summary and the transcripts of the February 2009 AP meeting can also be found on the HMS website at: <http://www.nmfs.noaa.gov/sfa/hms/>.

On July 24, 2009 NMFS released the draft Amendment 3 to the 2006 Consolidated FMP and its proposed rule (74 FR 36892). In the proposed rule, NMFS announced nine public hearings that would take place from New Hampshire to Louisiana, and set a deadline for the public comment period, which was to end on September 22, 2009. On August 10, 2009 the comment period was extended to September 25, 2009 (74 FR 39914), to accommodate two public hearings scheduled on September 22, 2009, and the New England Fishery Management Council meeting that was scheduled from September 22 through 24, 2009. The draft Amendment was presented to the South Atlantic (74 FR 44352), Mid-Atlantic (74 FR 34556), Gulf of Mexico (74 FR 36669) Caribbean (74 FR 40168), and New England (74 FR 45821) Fishery Management Councils. During the comment period NMFS received 37 individual written comments regarding the proposed management measures in the DEIS. All the entities that provided written comments are listed in Table 12.1. The summary of the comments and NMFS' responses is provided in Appendix D and will also be in the final rule. Copies of all the written comments received can be found at <http://www.regulations.gov> (search for 0648-AW65).

After the end of the comment period, NMFS reviewed the public comments, the comments provided by the Northeast Fisheries Science Center and the Southeast Fishery Science

Center, and the analyses for the alternatives and made changes to the preferred alternatives and/or the supporting analyses, as needed, in order to address the comments received and/or other concerns that were raised during the comment period. All comments were considered when finalizing this document. NMFS also received comments from the Environmental Protection Agency (EPA) regarding the DEIS (July 24, 2009, 74 FR 36706). The DEIS received a rating of “LO,” which means lack of objection. NMFS responds to EPA’s specific comments in Appendix B with the other public comments received. Copies of this final document will be sent to the EPA regional offices, the HMS consulting parties (the affected Regional Fishery Management Councils, ICCAT Commissioners and advisory groups, and the Advisory Panels), the Atlantic and Gulf States Marine Fisheries Commissions, and other interested parties. An electronic version will also be placed on the HMS Management Division webpage.

**Table 12.1 Individuals that submitted written public comment for Draft Amendment 3 to the 2006 Consolidated HMS FMP**

<b>Name</b>	<b>Affiliation</b>
Anonymous	NA
Anonymous	NA
Marc Agger	NA
Craig Angelini	NA
Melvin Bell	South Carolina Department of Natural Resources
Chester Brewer	Coastal Conservation Association
Jon Cold	NA
Kenneth Evans	NA
Kenneth Goldman	American Elasmobranch Society
Eldon Greenberg	Agger Fish Corp.
Randy Gregory	North Carolina Division of Marine Fisheries
Elizabeth Griffin	Oceana
Peter Grimбилas	Greater Point Pleasant Charter Boat Association
Duane Harris	South Atlantic Fishery Management Council
John Henry	NA
William Hoffman	NA
Russell Hudson	Directed Shark Fisheries, Inc.
Joe Klostermann	NA
Robert Knapp	NA
Kimberly Marable	NA
Heinz Mueller	Environmental Protection Agency
Randy Pausina and Myron Fischer	Louisiana Department of Wildlife and Fisheries
Richard Robbins	Mid-Atlantic Fishery Management Council
Robert Shipp	Gulf of Mexico Fishery Management Council
Susan Shipman	Georgia Department of Natural Resources
Michael Sole	Florida Department of Environmental Protection
Stephen Spagnuola	NA
James Stewart	NA
David Stiller	NA
Mark Taylor	Jersey Coast Anglers Association
Jack G. Travelstead	Virginia Marine Resources Commission
Andrea Treece	Center for Biological Diversity
Sharon Young	Humane Society of the United States



**APPENDIX A TABLE OF CONTENTS**

**Appendix A Table of Contents ..... A-i**  
**Appendix A List of Tables..... A-ii**  
**A.0 Appendix: Quotas and Retention Limit Calculations ..... A-1**  
    A.1 Background ..... A-1  
    A.2 Alternative A2..... A-5  
    A.3 Alternatives A3 and A4 ..... A-10  
    A.4 Alternative A6..... A-17

**APPENDIX A LIST OF TABLES**

Table A.1 Number of blacknose sharks discarded alive, dead, and mortality rate for all gillnet gears based on 165 observed trips through the Gillnet Observer Program from 2005-2008. .... A-3

Table A.2 Percentages of shark species (individuals) caught in shark trips that directed on specific species based on 2005-2008 Shark Observer Program data..... A-3

Table A.3 Average landings from 1999 – 2005 and available commercial landings for blacknose sharks based on a 78 % reduction for all gear types..... A-8

Table A.4 Average landings from 1999 – 2005 and available commercial landings for blacknose sharks based on a 78 % reduction for all gears with no landings for gillnets..... A-8

Table A.5 Retention limits, discards, and total mortality of blacknose sharks per year under different scenarios for alternative A2. .... A-9

Table A.6 Percent reductions in non-blacknose SCS quotas based on average landings from 2004-2008 under alternative A3. .... A-14

Table A.7 Percent reductions in non-blacknose SCS quotas based on average landings from 2004-2008 under alternative A4. .... A-14

Table A.8 Blacknose shark harvest and discards under alternative A3..... A-15

Table A.9 Blacknose shark harvest and discards under alternative A4..... A-16

Table A.10 Total blacknose shark mortality under different non-blacknose SCS quota reductions for alternative A3. .... A-17

Table A.11 Total blacknose shark mortality under different non-blacknose SCS quota reductions for alternative A4. .... A-17

## **A.0 APPENDIX: QUOTAS AND RETENTION LIMIT CALCULATIONS**

For alternatives A2, A3, A4, and A6, NMFS calculated quotas and retention limits for blacknose sharks based on the blacknose shark TAC recommended in the 2007 SCS stock assessment. Fishing effort from 2004 to 2008 in the Coastal Fisheries Logbook, discards from the BLL and gillnet observer reports from 2005 – 2008, and landings reported through HMS shark dealer reports (*i.e.*, southeast and northeast general canvass and SEFSC quota monitoring databases) were used for all the quota calculations and the retention limit analyses. In all cases, NMFS accounted for total mortality from all fishing sectors (*e.g.*, commercial and recreational) within the Atlantic shark fishery, including landings and discards. As explained in Chapter 4, NMFS is working with the GMFMC and SAFMC to reduce blacknose shark discards in the shrimp trawl fisheries (Appendix E). Thus, for the alternatives considered below, NMFS assumes that bycatch of blacknose sharks in shrimp trawl fisheries is being reduced via Council action. The management measures analyzed in this document focus on the shark fisheries. By reducing the blacknose shark commercial quota below the blacknose commercial allowance for the Atlantic shark commercial fishery of 7,094 blacknose/year, NMFS would reduce fishing mortality below the level that would cause overfishing and allow blacknose sharks to rebuild with a 70 percent probability by 2027. The quotas and retention limits in this rulemaking are specific to the 2007 blacknose shark stock assessment, but based on the results of future stock assessments and/or estimates of landings, discards, and effort in the fisheries that interact with the blacknose shark, NMFS anticipates changing these quotas and retention limits via framework actions in the future, as necessary.

### **A.1 Background**

The 2007 SCS stock assessment recommended a blacknose-specific TAC of 19,200 blacknose sharks per year across all fisheries that interact with blacknose sharks. The assessment stated that this TAC would provide a 70 percent chance of rebuilding blacknose sharks by the year 2027. Based on this recommendation, NMFS considered several alternatives that establish a blacknose shark specific quota and a separate non-blacknose SCS quota. Establishing a separate blacknose shark quota would allow blacknose sharks to be managed separately from the other SCS and would give NMFS the ability to track this separate quota more efficiently, which is critical given the overfished and overfishing status of blacknose sharks.

To determine the proportion of the 19,200 blacknose shark TAC that would be available to the Atlantic shark commercial fishery, NMFS accounted for mortality of blacknose sharks in all sectors of recreational and commercial fisheries. First, the TAC of 19,200 blacknose sharks is a 78 percent reduction in harvest compared to the average annual harvest blacknose sharks experienced from 1999 – 2005 (86,381 blacknose sharks/year; Table 4.1 in Chapter 4). In order to attain the needed mortality reductions within the Atlantic shark commercial fisheries, NMFS would establish an Atlantic shark commercial fishery allowance. This commercial allowance would be a 78 percent reduction in blacknose shark mortality in the Atlantic shark commercial fishery.

The average annual landings of blacknose sharks within the Atlantic shark commercial fishery was 27,484 blacknose sharks from 1999 – 2005, and average annual discards were 5,007

blacknose sharks over that same time period. A 78 percent reduction in blacknose shark landings (6,046 blacknose sharks/year) and discards (1,102 blacknose sharks/year) in the Atlantic shark fisheries would be a total of 7,148 blacknose sharks per year ( $6,046 + 1,102 = 7,148$ ). However, blacknose sharks are also taken in the exempted fishing program. Therefore, to determine the commercial allowance for the Atlantic shark commercial fishery, NMFS subtracted the amount of blacknose sharks that are caught in the exempted fishing program. On average, 54 blacknose sharks are taken (*i.e.*, kept or discarded dead) under the exempted fishing program. Thus, the commercial allowance available to Atlantic shark commercial fishermen would be 7,094 blacknose sharks ( $7,148$  blacknose sharks – 54 blacknose sharks taken in the EFP program = 7,094 blacknose sharks) (Table A.3). This number of blacknose sharks needs to be converted to weight since that is how the quota is monitored.

In this document NMFS revised the quotas in alternatives A2 – A4 from those described in the DEIS. The revised quotas would still establish a non-blacknose SCS quota for finetooth, Atlantic sharpnose, and bonnethead sharks. However, rather than subtracting the average blacknose shark landings from the SCS quota, as was done in the DEIS, the revised non-blacknose SCS quota would be based on the average landings of finetooth, Atlantic sharpnose, and bonnethead sharks from 2004 – 2008, or 221.6 mt dw. This change in approach is due, in part, to be consistent with the 2007 SCS stock assessment that indicated that, while none of those three species are currently overfished, or undergoing overfishing, fishing mortality should not be increased. With regards to blacknose sharks, the quotas for alternatives A2 – A4 in the DEIS was based on average landings from 2004 – 2007. The revised blacknose quota was calculated as it was in the DEIS but is based on the average landings of blacknose sharks of 55 mt dw for that same time period, 2004 – 2008.

For the FEIS, NMFS calculated the number of discards associated with each trip using the discard mortality rate based on the 2005 through 2008 Shark Gillnet Observer Data. A total of 165 gillnet trips were observed. In the observer data, sharks caught in gillnets were recorded as number landed, number discarded dead, and number discarded alive. Mortality rates were determined by gear type (surround, stake, and drift) observed in the gillnet fishery. Mortality rates by gear were 81 percent for the drift gillnet (65 released alive, 269 released dead), 97 percent for surround gillnets (29 released alive, 1044 released dead), and 60 percent for stake gillnets (433 released alive, 654 released dead) (Table A.1). Using this information, and counting all the sharks that were released alive as likely survivors, a mortality rate of 80 percent was determined. This mortality rate differs from the rate used in the DEIS, where every shark discarded was treated as a mortality (100 percent). Because of this change to the projected mortality rate, and because of the change to the average size of blacknose shark caught in gillnets described later, the average number of blacknose caught in directed shark trips was modified from the numbers used in the DEIS.

**Table A.1** Number of blacknose sharks discarded alive, dead, and mortality rate for all gillnet gears based on 165 observed trips through the Gillnet Observer Program from 2005-2008.

Gear Type	No. Blacknose Discarded Alive	No. Blacknose Discarded Dead	Discard Mortality Rate
Drift Gillnet	65	269	0.81
Strike Gillnet	29	1044	0.97
Sink Gillnet	433	654	0.60

Analysis of the 2005 – 2008 Shark Gillnet Observer Data also showed that blacknose shark catch rates varies among the intended target of the trip. Trips were observed that reported the intended target species as blacknose sharks, blacktip sharks, Atlantic sharpnose sharks, bonnethead sharks, smooth dogfish, or as unspecified shark trips. The data covered 110 directed shark trips in which a total of 264 sets with various gillnet gears were made. In three observed trips that specifically targeted blacknose sharks (totaling 15 sets), 169 blacknose sharks were caught, compared to 94 non-blacknose sharks that were landed. This gives a blacknose shark catch rate of 63.7 percent for those trips that specifically targeted that species (Table A.2).

However, in directed shark trips using gillnets, the blacknose shark catch rates were relatively low for those trips that targeted non-blacknose sharks, or were generic shark trips. For trips targeting blacktip sharks, a total of 17 blacknose sharks were caught in sixteen sets, compared to 623 non-blacknose sharks. This represents a catch rate of 2.6 percent for blacknose sharks in trips targeting blacktip sharks. From sixteen sets that specifically targeted Atlantic sharpnose, a total of 4,671 non-blacknose sharks were caught compared to 65 blacknose sharks, or a catch rate of 1.4 percent for blacknose sharks. In twenty-two sets from trips targeting bonnethead sharks, there were 142 blacknose sharks (8.3 percent) caught compared to 1,566 non-blacknose sharks. There were 29,670 non-blacknose sharks caught from 182 sets in trips recorded as unspecified shark trips. The number of blacknose sharks caught in these unspecified shark trips were 1,201, or 3.9 percent. From thirteen sets targeting smooth dogfish there were no blacknose sharks caught (Table A.2).

**Table A.2** Percentages of shark species (individuals) caught in shark trips that directed on specific species based on 2005-2008 Shark Observer Program data.

	Blacknose Shark Trip	Blacktip Shark Trip	Atlantic Sharpnose Shark Trip	Bonnethead Shark Trips	Unspecified Shark Trip
Blacknose	64.3 % (169)	2.6 % (17)	1.4 % (65)	8.3 % (142)	3.9 % (1,201)
Blacktip	7.6 % (20)	35.1 % (225)	0.4% (15)	0.2 % (3)	41.4 % (12,787)
Atlantic sharpnose	17.1 % (45)	0.6 % (4)	92.8 % (4,393)	14.8 % (252)	36.9 % (11,377)
Bonnethead	3.8 % (10)	0.5% (3)	1.8 % (87)	72.7 % (1,242)	4.6 % (1,431)
Spinner	4.6 % (12)	47.3% (303)	2.6 % (121)	1.6 % (28)	4.3% (1,315)

	<b>Blacknose Shark Trip</b>	<b>Blacktip Shark Trip</b>	<b>Atlantic Sharpnose Shark Trip</b>	<b>Bonnethead Shark Trips</b>	<b>Unspecified Shark Trip</b>
Finetooth	0.4 % (1)	12.8% (82)			8.4 % (2,584)
Scalloped Hammerhead	2.3 % (6)	1.0% (6)	0.6 % (29)	2.2 % (38)	0.4 % (122)
Others			0.5 % (26)	0.2 % (3)	0.1 % (54)

Based on this revised mortality estimate, the average number of blacknose sharks caught per trip for all directed shark vessels that landed blacknose sharks changed from 64.3 to 44.1. For those directed shark vessels that did not use gillnet gear, the average number of blacknose sharks caught per trip changed from 84.5 to 78.0. The calculation for the number of blacknose sharks caught in the DEIS was based on the total landings (in numbers) by gear for each region, divided by the total number of trips by gear for each region. In the FEIS, the total number of blacknose sharks caught by region was multiplied by the weighted average of each gear (the total number of trips of each gear for each region divided by the total number of trips for all gears). Based on this method, the gillnet average blacknose catch/trip in the GOM changed from 60.6 to 9.8 on 43 trips, while the average/trip in the SAT dropped from 29.6 to 8.3 on 429 trips. These changes led to the revised average number of blacknose sharks landed by directed shark vessels described above. With regards to incidental shark vessels, on average, those vessels that use gillnet gear that landed blacknose sharks caught 0.6 blacknose sharks per trip, whereas incidental vessels that did not use gillnet gear caught, on average, 1.2 blacknose sharks per trip. Based on these different catch rates for directed and incidental permitted vessels, NMFS determined the number of blacknose sharks that would be discarded dead for each trip under the different alternatives.

In order to achieve the 78 percent reduction in harvest as required from the 2007 SCS stock assessment, the commercial quota was determined by multiplying the expected landings by the average weight for blacknose sharks caught in the various gears in the fishery. For instance, in the bottom longline fishery, the annual blacknose shark landings from 1999 to 2005 were 8,091 blacknose sharks/year (Table 4.1). Multiplied by 22 percent (a 78 percent reduction), the total estimated landings from the bottom longline fishery would be 1,780 blacknose sharks. Multiplying that number by the average weight of blacknose shark caught in that fishery (5.4 lb dw) results in an estimated landings weight of 9,612 lb dw (8,091 blacknose sharks/year x 0.22 reduction in landings x 5.4 lb dw / avg blacknose shark = 9,612 lb dw). The process was repeated for each commercial category shown in Table 4.1. A major change from the DEIS to the FEIS was the average weight of the blacknose sharks caught in the gillnet fisheries. In the DEIS, the average weight used for blacknose sharks caught in gillnet gear was 14.4 lb dw, but revised data from the SEFSC indicates that the average weight for blacknose sharks caught in gillnet gear is actually 18.7 lb dw. Therefore, this weight was used in the FEIS in all analyses that calculate retention limits and quotas.

For those alternatives that allow all currently authorized gears (*e.g.*, alternative A3), the total mortality allowance (landings and discards) for blacknose sharks would be 94,313 lb dw (42.8 mt dw) (9,612 lb dw BLL estimated landings + 78,335 lb dw GN estimated landings + 418 lb dw HL estimated landings + 5, 948 lb dw BLL Discards = 94,313 lb dw blacknose shark

mortality allowance). However, after subtracting the sharks taken in the exempted fishing program (178 lb dw), the total commercial mortality allowance is actually 94,135 lb dw (94,313 lb dw – 178 lb dw = 94,135 lb dw), or 42.7 mt dw (Table A.3).

For those alternatives that would eliminate gillnets as an authorized gear (*e.g.*, alternative A4), the total mortality allowance (landings and discards) for blacknose sharks would be 38,599 lb dw (17.5 mt dw) (9,612 lb dw BLL estimated landings + 22,621 lb dw GN estimated catch + 418 lb dw HL estimated landings + 5,948 lb dw BLL Discards = 38,599 lb dw blacknose shark mortality allowance) after a 78 percent reduction in harvest as required from the 2007 SCS stock assessment. Again, after subtracting the sharks taken in the exempted fishing program (178 lb dw), the total commercial mortality allowance is actually 38,421 lb dw (38,599 lb dw – 178 lb dw = 38,421 lb dw), or 17.4 mt dw (Table A.4).

The alternatives described below consider reducing blacknose shark harvest through various gear and landings restrictions. The overall goal is to reduce the total number of blacknose shark landings and discards to 7,094 blacknose sharks/year. Since the average size of blacknose sharks caught differs among the various gears used in the shark fisheries, the quota (in lb dw) for each alternative varies depending on the gears that are included in that alternative. In each alternative, various methods are explored to reduce the blacknose sharks harvest below the commercial allowance, while maximizing the allowable non-blacknose SCS quota.

## **A.2 Alternative A2**

Under alternative A2 NMFS would set the non-blacknose SCS quota at 221.6 mt dw (488,539 lb dw), and the blacknose shark quota at 12.1 mt dw (26,676 lb dw). The non-blacknose quota would apply to finetooth, Atlantic sharpnose, and bonnethead sharks, and would be equal to the average landings for those species from 2004 through 2008. The blacknose quota of 12.1 mt dw would be a 78 percent reduction in average landings for the years 2004 through 2008. The quotas reflect changes from those considered in the DEIS, which used an average weight of 10.5 lb dw of blacknose sharks for the combined BLL and gillnet fisheries, and an average weight for blacknose sharks caught in the gillnet fisheries of 14.4 lb. dw. As described above, revised data indicates that the average weight for blacknose sharks caught in the gillnet fishery is actually larger (18.7 lb dw) than that used in the DEIS. Using this revised average weight and the weighted averages for the number of trips per gear, an updated average weight for blacknose sharks of 6.4 lb dw was used for the combined BLL and gillnet fisheries in the FEIS scenarios. For those scenarios that exclude gillnet gear, in both the DEIS and FEIS, an average weight for blacknose sharks of 5.4 lb dw was used. This average weight was based on the 2004 through 2008 landings for each gear type (excluding gillnets), multiplied by the weighted trip average of each gear.

In considering this alternative, NMFS used several scenarios to analyze the impact of the different retention limits for directed and incidental shark permit holders, and the inclusion and exclusion of certain gear types on the amount of blacknose sharks landed and discarded. By doing this, NMFS was able to evaluate whether or not a particular retention limit/gear type combination would result in total mortality above or below the commercial shark fishery allowance (7,094 blacknose sharks/year). Refer to Table A.5 for the following discussions.

In the first scenario under alternative A2, directed shark permit holders only would be allowed to retain blacknose sharks. These permit holders could retain blacknose sharks up to the established retention limit. Gillnets would be retained as an authorized gear. All blacknose sharks caught under incidental shark permits would have to be discarded. In scenario 2, both directed and incidental shark permit holders would be allowed to retain blacknose sharks. For both directed and incidental shark permit holders, all blacknose sharks caught in excess of their respective retention limit would have to be discarded. Gillnets would remain an authorized gear in the shark fishery. Under scenarios 3 and 4, gillnets would be removed as an authorized gear in the shark fishery. Scenario 3 would allow the retention of blacknose sharks by directed shark permit holders only. All incidental shark permit holders would have to discard any blacknose sharks. Scenario 4 would allow retention of blacknose sharks by directed and incidental shark permit holders. For scenarios 5 and 6, the retention of blacknose sharks would be prohibited by all directed and incidental shark permit holders. Gillnets would be retained as an authorized gear under scenario 5, while gillnets would be prohibited by scenario 6.

To determine the maximum retention limit under each scenario, NMFS first divided the number of blacknose sharks available to the commercial shark fishery (7,094 sharks) by the average number of historical trips taken per year estimated from the Coastal Fisheries Logbook from 2004 – 2007 for directed and incidental permit holders (251.3 trips with gillnet gear and 129 trips without gillnet gear). This level of effort may have changed with the implementation of Amendment 2 to the 2006 Consolidated HMS FMP. However, at the time of these analyses NMFS only had additional data for 2008 (complete and reviewed annual data is not available until late Spring or early Summer of the following year) and any changes as a result of Amendment 2 would only be reflected in part of 2008 given the fact that Amendment 2 was not implemented until July 15, 2008. Therefore, NMFS relied on Coastal Fisheries logbook data from 2004 – 2007 to calculate the number of trips taken by directed and incidental shark fishermen for this rulemaking. Starting from this maximum retention limit, NMFS proceeded to reduce the retention limits for each scenario until the total landings in the species specific blacknose shark weight were less than or equal to the quota considered in this alternative (12.1 mt dw).

For scenario 1, which would allow gillnets to remain an authorized shark fishing gear, NMFS divided 4,272 blacknose sharks, which would be the number of sharks landed by the average number of directed trips that landed blacknose sharks in the past (*i.e.*, 251.3 trips), with a directed trip limit of 17 blacknose sharks per trip ( $4,272 \text{ blacknose sharks} / 251.3 \text{ trips} = 17 \text{ blacknose sharks/trip}$ ) (Table A.5). However, on average historically, these trips caught 44.1 blacknose sharks per trip. Therefore, under this scenario directed shark permit holders would discard 27.1 blacknose sharks per trip ( $44.1 - 17 \text{ blacknose sharks/trip} = 27 \text{ blacknose sharks/trip}$ ). NMFS then multiplied the number of discards per trip by the average number of trips by directed permit holders that landed blacknose sharks per year in the past (251.3 trips/year) to get the total number of directed discards or 6,810.2 blacknose sharks ( $27.1 \text{ blacknose sharks/trip} \times 251.3 \text{ directed trips} = 6,810.2 \text{ blacknose shark discards}$ ). Multiplying the number of discards by the mortality rate of 80 percent, the total number of dead discards for the directed shark fishery would be 5,448.2 ( $6,810.2 \text{ discards/year} \times 0.8 \text{ mortality rate} = 5,448.2 \text{ dead discards/year}$ ) (Table A.5).

For incidental permit holders, multiplying the average number of blacknose sharks per year by the percentage of trips for each gear resulted in a weighted average of 0.54 blacknose sharks/trip. This number is the average number of blacknose sharks that would be expected to be discarded dead per trip by incidental permit holders with a zero retention limit under scenario 1. Thus, under scenario 1, NMFS would expect approximately 119 blacknose sharks (0.54 blacknose sharks/trip x 222 incidental trips = 119 blacknose shark discards) to be discarded per year by incidental permit holders. NMFS used the same approach to determine the number of directed and incidental discards per trip under the remaining scenarios in Table A.5.

For scenario 2, incidental shark permit holders would be allowed to retain what they currently catch, or an average one blacknose shark per trip. Directed shark permit holders would also be allowed to retain blacknose sharks. Therefore, NMFS subtracted the number of blacknose sharks caught by incidental shark permit holders (0.54 blacknose sharks/trip x 222 incidental trips = 119 blacknose shark landings) from the total blacknose sharks available to commercial shark fishermen (*i.e.*, 4,272 blacknose sharks), which resulted in 4,153 blacknose sharks available to directed shark permit holders (4,272 blacknose sharks – 119 blacknose sharks = 4,153 blacknose sharks). NMFS then divided the 4,153 blacknose sharks available to directed shark permit holders by the number of average directed shark trips that landed blacknose sharks in the past (*i.e.*, 251.3 trips), which would result in a retention limit of 16 blacknose sharks per trip for directed permit holders (Table A.5). NMFS used the same approach for scenario 3 and 4, making changes in number of trips and in retention limits for the exclusion of gillnets (Table A.5). Scenarios 5 and 6 assumed no retention of blacknose sharks by all permit holders.

Finally, NMFS determined the total mortality anticipated under each scenario. NMFS added the estimated number of directed and incidental dead discards/year as well as the estimated number of sharks harvested/year to estimate total mortality/year in numbers. Total mortality was also calculated in weight by multiplying the estimated number of sharks killed under each scenario by the average blacknose weight for all gears combined (Table A.5). For example, the estimated total blacknose shark mortality in numbers for scenario 1 would be 9,838. This was calculated by adding 5,448 (the estimated number of dead discards by directed permit holders), plus 119 (the estimated number of dead discards by incidental permit holders), and the 4,272 landed blacknose sharks. The estimated total mortality in weight for scenario 1 is 63,260 lb dw. Based on this, NMFS was able to compare the estimated total mortality per year in terms of the number of blacknose sharks and weight of blacknose sharks under the different scenarios to the commercial allowance for the commercial shark fishery.

For those scenarios (1, 2, and 5) that allow all gear types to continue fishing, the projected landings (in weight) would fall below the available commercial allowance for blacknose sharks of 94,135 lb dw (Table A.5). This is due primarily to the higher per shark average weight of blacknose sharks caught in gillnets (18.7 lb dw), which results in that higher commercial quota. Because of the smaller average blacknose shark weight caught in BLL gear and the higher discard rate, those scenarios (3, 4, and 6) that exclude gillnets would exceed the annual blacknose shark commercial allowance of 38,421 lb dw (Table A.5). Even though several of the scenarios would meet the commercial weight quota for blacknose sharks based on the recommended restrictions in terms of weight, none of them would meet the commercial allowance of 7,094 blacknose sharks per year. This is due in part to the large number of juvenile blacknose sharks discarded by some gears in the commercial shark fisheries.

**Table A.3 Average landings from 1999 – 2005 and available commercial landings for blacknose sharks based on a 78 % reduction for all gear types.**

<b>Gear</b>	<b>Avg No. Blacknose Landed</b>	<b>Avg wt/Gear (lb dw)</b>	<b>Average Landings (lbs dw)</b>	<b>78% Reduction in No. Landed</b>	<b>78% Weight Reduction (lbs dw)</b>	<b>78% Weight Reduction (mt dw)</b>
BLL	8,091	5.4	43,691.4	1,780	9,612.1	4.4
GN	19,041	18.7	356,066.7	4,189	78,334.7	35.5
Handline	352	5.4	1,900.8	77	418.2	0.2
BLL discards	5,007	5.4	27,037.8	1,102	5,948.3	2.7
EFP program (avg/year)	54	3.3	178.2	54	178.2	0.1
<b>Total</b>	<b>32,545</b>		<b>428,518.5</b>	<b>7,094</b>	<b>94,135.1</b>	<b>42.7</b>

**Table A.4 Average landings from 1999 – 2005 and available commercial landings for blacknose sharks based on a 78 % reduction for all gears with no landings for gillnets.**

Note: The gillnet numbers below represent the expected mortality from blacknose sharks being caught in other gillnet fisheries

<b>Gear</b>	<b>Avg No. Blacknose Landed</b>	<b>Avg wt/Gear (lb dw)</b>	<b>Total Landings (lbs. dw)</b>	<b>78% Reduction in No. Landed</b>	<b>78% Weight Reduction (lbs dw)</b>	<b>78% Weight Reduction (mt dw)</b>
BLL	8,091	5.4	43,691.4	1,780	9,612.1	4.4
GN	19,041	5.4	102,821.4	4,189	22,620.7	10.3
Handline	352	5.4	1,900.8	77	418.2	0.2
BLL discards	5,007	5.4	27,037.8	1,102	5,948.3	2.7
EFP program (avg/year)	54	3.3	178.2	54	178.2	0.1
<b>Total</b>	<b>32,545</b>		<b>175,273.2</b>	<b>7,094</b>	<b>38,421.1</b>	<b>17.4</b>

**Table A.5 Retention limits, discards, and total mortality of blacknose sharks per year under different scenarios for alternative A2.**

Note: commercial blacknose shark mortality allowance for Atlantic shark commercial fishery = 7,094.

	Gillnets Included		Gillnets Excluded		No Retention of Blacknose	
	Scenario 1: Directed Permit Holders Only	Scenario 2: Directed & Incidental Permit Holders	Scenario 3: Directed Permit Holders Only	Scenario 4: Directed & Incidental Permit Holders	Scenario 5: Gillnets Included	Scenario 6: Gillnets Excluded
Retention Limit/Trip	17	16	30	31	0	0
Avg. No. Trips/year by Directed Permit Holders	251.3	251.3	129.3	129.3	251.3	129.3
Dead Discards/day by Directed Permit Holders	27.1	28.1	48	48	44.1	78
Dead Discards/year by Directed Permit Holders	5,448.2	5,649.5	4,958.7	4,958.7	8,865.5	8,060.7
Avg. No. Trips /year by Incidental Permit Holders	222	222	92	92	222	92
Dead Discards/trip by Incidental Permit Holders	0.5	0	1.2	0.2	0.5	1.2
Dead Discards/year by Incidental Permit Holders	118.6	0	108.6	16.4	118.6	108.6
Total Dead Discards/year	5,567.0	5,649.5	5,067.4	4,975.2	8,984.0	8,169.4
Total Mortality/year in Numbers	9,838.2	9,788.0	8,944.9	9,074.1	8,984.0	8,169.4
Average Blacknose Weight (lb dw)	6.4	6.4	6.4	6.4	6.4	6.4
Total Mortality/year in Weight (lb dw)	63,260.3	62,937.2	57,515.5	58,346.6	57,767.4	52,529.1
Total Mortality Allowed/year in Weight (lb dw)	94,135.1	94,135.1	38,421.1	38,421.1	94,135.1	0.0
Difference (if positive, meets goal)	30,874.8	31,197.9	-19,094.4	-19,925.5	36,367.6	-14,108.0

### A.3 Alternatives A3 and A4

In the DEIS, alternative A3 proposed a non-blacknose SCS quota of 42.7 mt dw, or an 82 percent landings reduction, and a blacknose quota of 16.6 mt. dw. Alternative A4 originally proposed a 56.9 mt dw non-blacknose SCS quota, or a 76 percent landings reduction, and a blacknose quota of 14.9 mt dw. In determining the quotas in the DEIS, the average number of blacknose sharks caught in the directed fisheries under alternative A3, which allowed all current gear types, was 64.3. The average number of blacknose sharks caught in the directed shark fishery under alternative A4, which would exclude gillnets, was 84.5.

Because of the revisions between the DEIS and FEIS described earlier for mortality rates of sharks released from gillnets, and the average weight of sharks caught in gillnets, NMFS has modified the quotas for alternative A3 and A4. In both alternatives, NMFS looked at reductions in the non-blacknose SCS quota to determine the level of non-blacknose SCS harvest that would allow for a limited blacknose shark fishery and a reduction in discards. The methodology for both alternatives was the same. The only difference between them is whether shark gillnet gear was allowed. As previously described, for the alternatives in this document NMFS was aiming to keep the commercial harvest of blacknose sharks at or under 7,094 blacknose sharks per year.

NMFS determined the average annual landings from 2004 through 2008 for finetooth, Atlantic sharpnose, and bonnethead sharks, in other words, the landings of non-blacknose SCS (see Table 4.2 in Chapter 4). NMFS then calculated what these landings would be under various percent reductions under alternatives A3 and A4 (Table A.6 and Table A.7). NMFS also determined the number of trips it would take to harvest these reduced landings, based on past retention of non-blacknose SCS for directed shark permit holders (see below). Based on the percentage of non-blacknose SCS trips taken by directed shark permit holders that landed blacknose sharks in the past (see below), NMFS then determined the number of blacknose sharks that would be caught, kept, and discarded while the different non-blacknose SCS quotas were harvested under alternatives A3 and A4 (Table A.8 and Table A.9).

Neither alternative would change the retention limit for SCS for directed shark permit holders (*i.e.*, no trip limits for SCS and pelagic sharks for directed shark permit holders). However, under alternative A3, incidental permit holders would be able to retain blacknose sharks, so they would be able to retain 16 SCS (blacknose and non-blacknose SCS) and pelagic sharks combined per trip. Under alternative A4, incidental permit holders would not be allowed to retain blacknose sharks, but they would still be able to retain 16 non-blacknose SCS and pelagic sharks combined per trip. In addition, NMFS assumed that fishermen would fish for non-blacknose SCS in a directed fashion until the non-blacknose SCS and/or blacknose shark quotas reached 80 percent. At that time, both the non-blacknose SCS fishery and the blacknose shark fishery would close, and fishermen would fish for other fish species, and all SCS, including blacknose sharks, would have to be discarded.

For each various percent reductions in landings, NMFS determined the number of trips it would take to harvest that reduced non-blacknose SCS quota based on the average number of non-blacknose SCS kept from 2004 through 2008 (column E in Table A.6 and Table A.7). NMFS determined the average number of non-blacknose SCS kept per trip from Coastal Fisheries logbook data from 2004 through 2007. For all gear types under alternative A3, 140.9

non-blacknose SCS were kept per trip (Table A.6). With the exclusion of gillnets under alternative A4, fishermen kept, on average, 134.7 non-blacknose SCS per trip (Table A.7). NMFS then determined the number of trips it would take to fulfill the non-blacknose SCS quota by dividing the total number of sharks available under the reduced non-blacknose SCS quota (columns D in Table A.6 and Table A.7) by the average number of non-blacknose SCS kept per trip (columns E in Table A.6 and Table A.7).

NMFS then estimated the number of trips it would take for directed shark permit holders to catch blacknose sharks while harvesting the non-blacknose SCS quota (columns E in Table A.8 and Table A.9). To do this, NMFS determined the percentage of trips taken by directed shark permit holders that harvested blacknose sharks relative to the overall number of trips taken by directed shark permit holders that landed SCS during 2004 through 2007 (based on the Coastal Fisheries logbook data for those years). On average, 36 percent of the trips taken by directed shark permit holders that landed SCS landed blacknose sharks (251.3 directed trips that landed blacknose sharks / 696.8 directed trips that landed SCS = 36 percent).

Due to revisions between the DEIS and FEIS in the mortality rate and the size of blacknose sharks caught in the gillnets fisheries described above, the average number of blacknose sharks caught per trip used in the FEIS for alternative A3 was revised to 44.1 (column B in Table A.8), and alternative A4 was revised to 78.0 (column B Table A.9). Because of the revisions to the average number of blacknose sharks caught per trip, the retention limit and the number of discards under each alternative has also been revised from the figures used in the DEIS. In this document the retention limit for alternatives A3 and A4 are equal to the average landings per trip, 44.1 and 78.0, respectively (columns C in Table A.8 and Table A.9). Because the revised retention limit is equal to the average landing per trip, the dead discards drops to 0 (column D in Table A.8 and Table A.9), as the directed shark fisheries would be allowed to retain all blacknose sharks caught up to the 2004 through 2007 average trip landings.

By multiplying the number of trips estimated to catch blacknose sharks (36 percent of the trips taken to harvest non-blacknose SCS or columns E in Table A.8 and Table A.9), by the sum of the average number of blacknose sharks kept (columns C in Table A.8 and Table A.9) and the number discarded dead (columns D in Table A.8 and Table A.9), in both cases 0, NMFS determined the number of blacknose that would be harvested (columns H, I, and J in Table A.8 and Table A.9) and discarded dead (columns F and G in Table A.8 and Table A.9) while the non-blacknose SCS quota is harvested under alternatives A3 and A4. The blacknose quota is based on the number of blacknose sharks taken while fishermen harvest the non-blacknose SCS quota (columns J in Table A.8 and Table A.9).

In this FEIS for alternative A3, NMFS assumed all fishing gears that are currently authorized for sharks would continue to be used to harvest sharks. Under alternative A3, the available commercial harvest would be equivalent to 95,135 lb. dw (42.7 mt dw) (7,094 sharks x 13.4 lb dw /blacknose shark = 95,135 lb dw) using the average weight for blacknose sharks caught in BLL and gillnet gear of 13.4 lb dw. In this document alternative A3, would set the blacknose shark quota at 19.9 mt dw, a 64 percent reduction in the average landings from 2004–2008, while the non-blacknose SCS quota would be set at 110.8 mt dw, a 50 percent reduction in landings.

Under alternative A4 in this FEIS, because gillnet gear would no longer be allowed to harvest sharks, NMFS assumed that directed fishing effort for sharks with gillnet gear would stop and that non-directed shark fishermen would still use gillnet gear to harvest other fish species and would discard any sharks that were caught. Under alternative A4, the available commercial harvest would be equivalent to 38,421 lb dw (17.1 mt dw) (7,094 sharks x 5.4 lb dw / blacknose shark = 38,421 lb dw) using the average weight of 5.4 lb dw for blacknose sharks caught in all other gears with the exclusion of gillnet gear. Alternative A4 would set the blacknose shark quota at 15.9 mt dw, a 71 percent reduction in the average landings from 2004 through 2008, while the non-blacknose SCS quota would be set at 55.4 mt dw (a 75 percent reduction in landings).

Once the non-blacknose SCS and blacknose shark quotas are filled and those fisheries close, NMFS assumes that all trips taken by directed shark permit holders for non-blacknose SCS and blacknose sharks would stop and fishermen would target other fish species (*e.g.*, Spanish mackerel, bluefish, etc.). Any SCS caught, including blacknose sharks, would have to be discarded. On average, 0.5 blacknose sharks (column B in Table A.8) and 22.7 non-blacknose SCS were caught (kept and discarded dead) on trips taken by incidental permit holders that includes gillnet gear under alternative A3. When gillnet gear is excluded under alternative A4, on average, 1.2 blacknose sharks (column B in Table A.9) and 18.7 non-blacknose SCS were caught on trips taken by incidental permit holders. NMFS assumes that the remaining directed SCS effort would target other fish species, and all SCS caught, including blacknose sharks, would have to be discarded. Thus, NMFS estimated the number of blacknose sharks (columns F and G in Table A.8 and Table A.9) that would be discarded for the remaining SCS trips fished in an incidental fashion (columns E in Table A.8 and Table A.9) based on the same methodology as explained above.

NMFS assumes that fishermen with incidental shark permits would continue to catch sharks and would catch and discard blacknose sharks as described above. For incidental permit holders, NMFS determined the number of blacknose sharks that would be discarded by multiplying the average number of blacknose caught by this group (columns B in Table A.8 and Table A.9) by the number of trips anticipated under alternatives A3 and A4 (columns E in Table A.8 and Table A.9). The number of trips taken by incidental permit holders was estimated from 2004 – 2007 Coastal Fisheries logbook data, where, on average, there were 222 trips taken by incidental permit holders that landed SCS using all gear types (columns E in Table A.8 and Table A.9). To estimate blacknose shark discards by incidental permit holders, NMFS used the average number of blacknose sharks caught across all gear types and the average number of trips taken by incidental permit holders for all gear types estimated from the Coastal Fisheries logbook from 2004 – 2007.

NMFS also determined the number of discards for non-blacknose SCS by incidental permit holders. NMFS used estimates of percent discards from the BLL and gillnet observer programs from 2005 – 2008 to estimate the number of discards of non-blacknose SCS by incidental permit holders. On average, incidental permit holders discarded 5.6 non-blacknose SCS per trip. NMFS determined total discards by multiplying the average number of non-blacknose SCS discarded per trip (*e.g.*, 5.6 non-blacknose SCS) by the total number of incidental

trips (columns E in Table A.8 and Table A.9). In addition, NMFS included the number of non-blacknose SCS that gillnet fishermen with incidental shark permits would have to discard under alternatives A4 and B2 and B3 by multiplying the average number of non-blacknose SCS kept by gillnet fishermen with incidental shark permits (*e.g.*, 16.1) by the number of gillnet trips under alternatives B2 (*e.g.*, 130 trips) and B3 (*e.g.*, 123.3 trips).

To determine the total mortality of blacknose sharks, NMFS added the weight of blacknose sharks landed and discarded dead under the different non-blacknose SCS quota reductions (columns D in Table A.10 and Table A.11). Total mortality was found by adding up the weight (lb dw) of blacknose sharks discarded and landed by the different permit holders under alternatives A3 and A4 (columns G and I in Table A.8 and Table A.9). To determine the total mortality in number, NMFS divided the total weight of blacknose sharks harvested and discarded (columns D in Table A.10 and Table A.11) by 6.4 lb dw for alternative A3 (which is the average weight of blacknose caught on BLL and gillnet gear), and 5.4 lb dw under alternative A4 (which is the average weight of blacknose caught on BLL gear only since gillnet gear would be excluded under alternative A4) (columns E in Table A.10 and Table A.11).

At the quota levels for alternative A3, the annual number of projected blacknose shark mortalities would be 6,964 (column E Table A.10) which is just below the target mortality number of 7,094. This number of blacknose mortalities translates into a total weight of 44,777 lb dw (column D Table A.10), or 19.9 mt dw. Under the quotas for alternative A4, the number of projected blacknose shark mortalities would be 6,557 (column E Table A.11). That number of blacknose sharks would translate into a commercial landings of 35,406 lb dw (column D Table A.11), or 15.9 mt dw. Under these alternatives, NMFS would close down the directed shark fisheries when either the non-blacknose SCS quota or the blacknose shark individual quota reached, or was expected to reach, 80 percent of the target amount.

Even though both alternatives A3 and A4 meet the reduction targets in terms of landings weight, and numbers, they meet the reduction targets in significantly different ways. For alternative A3, the number of blacknose sharks landed remains under the proposed quota by 130 blacknose sharks (7,094 blacknose quota – 6,964 blacknose landed = 130 blacknose sharks remaining), but the landings of 44,777 lb dw falls well short of the available quota (94,135 lb dw blacknose quota – 44,777 lb dw blacknose landed = 49,357 lb dw quota remaining). Under alternative A4, the projected blacknose landings, in terms of weight, would fall short of the available quota by 3,014 lb dw (38,421 lb dw blacknose quota - 35,406 lb dw blacknose landed = 3,014 lb dw quota remaining). Using the average size of blacknose caught (5.4 lb dw) in all gear types except gillnets, the projected landings in numbers of individuals would fall significantly short of the available quota by 537 sharks (7,094 blacknose quota – 6,557 blacknose landed = 537 blacknose sharks remaining).

**Table A.6** Percent reductions in non-blacknose SCS quotas based on average landings from 2004-2008 under alternative A3.

<b>A</b> Reduction of Non- Blacknose SCS Landings	<b>B</b> Landings with Reduction (lb dw)	<b>C</b> Landings with Reduction (mt dw)	<b>D</b> Landings with Reduction (number)	<b>E</b> Avg. retention/trip (number) of non- blacknose SCS for directed permit holders	<b>F</b> # Trips/Year to Catch Quota	<b>G</b> Reduction in # of Trips/Year
40%	293,178.1	133.0	71,189.9	140.9	505.3	78.7%
45%	268,746.6	121.9	65,257.4	140.9	463.2	80.5%
50%	244,315.1	110.8	59,325.0	140.9	421.1	82.2%
55%	219,883.6	99.7	53,392.5	140.9	379.0	84.0%
60%	195,452.1	88.7	47,460.0	140.9	336.9	85.8%
65%	171,020.6	77.6	41,527.5	140.9	294.8	87.6%
70%	146,589.1	66.5	35,595.0	140.9	252.7	89.3%
75%	122,157.6	55.4	29,662.5	140.9	210.6	91.1%
80%	97,726.0	44.3	23,730.0	140.9	168.4	92.9%

**Table A.7** Percent reductions in non-blacknose SCS quotas based on average landings from 2004-2008 under alternative A4.

<b>A</b> Reduction of Non- Blacknose SCS Landings	<b>B</b> Landings with Reduction (lb dw)	<b>C</b> Landings with Reduction (mt dw)	<b>D</b> Landings with Reduction (number)	<b>E</b> Avg. retention/trip (number) of non- blacknose SCS for directed permit holders	<b>F</b> # Trips/Year to Catch Quota	<b>G</b> Reduction in # of Trips/Year
50%	244,315.1	110.8	59,325.0	134.7	440.6	81.4%
55%	219,883.6	99.7	53,392.5	134.7	396.5	83.3%
60%	195,452.1	88.7	47,460.0	134.7	352.4	85.1%
70%	146,589.1	66.5	35,595.0	134.7	264.3	88.9%
75%	122,157.6	55.4	29,662.5	134.7	220.3	90.7%
76%	117,271.2	53.2	28,476.0	134.7	211.5	91.1%
78%	107,498.6	48.8	26,103.0	134.7	193.8	91.8%
80%	97,726.0	44.3	23,730.0	134.7	176.2	92.6%
85%	73,294.5	33.2	17,797.5	134.7	132.2	94.4%

**Table A.8 Blacknose shark harvest and discards under alternative A3.**

<b>A</b> Reduction in Non- Blacknose SCS Quota	<b>B</b> Avg # Blacknose Caught/Trip	<b>C</b> Avg. retention/trip (number) of blacknose for directed permit holders	<b>D</b> Discards (number per trip)	<b>E</b> Estimated # of Trips	<b>F</b> Total Discards (total # of sharks for all trips)	<b>G</b> Total Discards (lb dw)	<b>H</b> Total Kept (number of sharks)	<b>I</b> Total Kept (lb dw)	<b>J</b> Total Kept (mt dw)
<i>Directed Trips</i>									
40%	44.1	44.1	0	182.2	0.0	0.0	8,037.6	51,681.7	23.4
45%	44.1	44.1	0	167.0	0.0	0.0	7,367.8	47,374.9	21.5
50%	44.1	44.1	0	151.9	0.0	0.0	6,698.0	43,068.1	19.5
55%	44.1	44.1	0	136.7	0.0	0.0	6,028.2	38,761.3	17.6
60%	44.1	44.1	0	121.5	0.0	0.0	5,358.4	34,454.5	15.6
65%	44.1	44.1	0	106.3	0.0	0.0	4,688.6	30,147.7	13.7
70%	44.1	44.1	0	91.1	0.0	0.0	4,018.8	25,840.9	11.7
75%	44.1	44.1	0	75.9	0.0	0.0	3,349.0	21,534.0	9.8
80%	44.1	44.1	0	60.7	0.0	0.0	2,679.2	17,227.2	7.8
<i>Remaining directed trips that landed SCS (fishing in incidental fashion after quota filled)</i>									
40%	0.5	0	0.5	191.4	102.2	657.4	0	0	0
45%	0.5	0	0.5	233.5	124.7	802.1	0	0	0
50%	0.5	0	0.5	275.6	147.2	946.7	0	0	0
55%	0.5	0	0.5	317.7	169.7	1,091.4	0	0	0
60%	0.5	0	0.5	359.9	192.2	1,236.0	0	0	0
65%	0.5	0	0.5	402.0	214.7	1,380.6	0	0	0
70%	0.5	0	0.5	444.1	237.2	1,525.3	0	0	0
75%	0.5	0	0.5	486.2	259.7	1,669.9	0	0	0
80%	0.5	0	0.5	528.3	282.2	1,814.6	0	0	0
<i>Trips taken by incidental permit holders</i>									
40%	0.5	0.5	0.0	222	0	0.0	118.6	762.5	0.35
45%	0.5	0.5	0.0	222	0	0.0	118.6	762.5	0.35
50%	0.5	0.5	0.0	222	0	0.0	118.6	762.5	0.35
55%	0.5	0.5	0.0	222	0	0.0	118.6	762.5	0.35
60%	0.5	0.5	0.0	222	0	0.0	118.6	762.5	0.35
65%	0.5	0.5	0.0	222	0	0.0	118.6	762.5	0.35
70%	0.5	0.5	0.0	222	0	0.0	118.6	762.5	0.35
75%	0.5	0.5	0.0	222	0	0.0	118.6	762.5	0.35
80%	0.5	0.5	0.0	222	0	0.0	118.6	762.5	0.35

**Table A.9 Blacknose shark harvest and discards under alternative A4.**

<b>A</b> Reduction in Non- Blacknose SCS Quota	<b>B</b> Avg # Blacknose Caught/Trip	<b>C</b> Avg. retention/trip (number) of blacknose for directed permit holders	<b>D</b> Discards (number per trip)	<b>E</b> Estimated # of Trips	<b>F</b> Total Discards (total # of sharks for all trips)	<b>G</b> Total Discards (lb dw)	<b>H</b> Total Kept (number of sharks)	<b>I</b> Total Kept (lb dw)	<b>J</b> Total Kept (mt dw)
<i>Directed Trips</i>									
50%	78.0	78.0	0	158.9	0.0	0.0	12,384.6	66,876.7	30.3
55%	78.0	78.0	0	143.0	0.0	0.0	11,146.1	60,189.1	27.3
60%	78.0	78.0	0	127.1	0.0	0.0	9,907.7	53,501.4	24.3
70%	78.0	78.0	0	95.3	0.0	0.0	7,430.7	40,126.0	18.2
75%	78.0	78.0	0	79.4	0.0	0.0	6,192.3	33,438.4	15.2
76%	78.0	78.0	0	76.3	0.0	0.0	5,944.6	32,100.8	14.6
78%	78.0	78.0	0	69.9	0.0	0.0	5,449.2	29,425.8	13.3
80%	78.0	78.0	0	63.5	0.0	0.0	4,953.8	26,750.7	12.1
85%	78.0	78.0	0	47.7	0.0	0.0	3,715.4	20,063.0	9.1
<i>Remaining directed trips that landed SCS (fishing in incidental fashion after quota filled)</i>									
50%	1.2	0.0	1.2	-175.3	0.0	0.0	0	0	0
55%	1.2	0.0	1.2	-131.2	0.0	0.0	0	0	0
60%	1.2	0.0	1.2	-87.2	0.0	0.0	0	0	0
70%	1.2	0.0	1.2	0.9	0.0	0.0	0	0	0
75%	1.2	0.0	1.2	45.0	53.0	286.1	0	0	0
76%	1.2	0.0	1.2	53.8	63.4	342.2	0	0	0
78%	1.2	0.0	1.2	71.4	84.1	454.3	0	0	0
80%	1.2	0.0	1.2	89.0	104.9	566.4	0	0	0
85%	1.2	0.0	1.2	133.1	156.8	846.7	0	0	0
<i>Trips taken by incidental permit holders</i>									
50%	1.2	1.2	0.0	222	0.0	0.0	261.6	1,681.9	0.76
55%	1.2	1.2	0.0	222	0.0	0.0	261.6	1,681.9	0.76
60%	1.2	1.2	0.0	222	0.0	0.0	261.6	1,681.9	0.76
70%	1.2	1.2	0.0	222	0.0	0.0	261.6	1,681.9	0.76
75%	1.2	1.2	0.0	222	0.0	0.0	261.6	1,681.9	0.76
76%	1.2	1.2	0.0	222	0.0	0.0	261.6	1,681.9	0.76
78%	1.2	1.2	0.0	222	0.0	0.0	261.6	1,681.9	0.76
80%	1.2	1.2	0.0	222	0.0	0.0	261.6	1,681.9	0.76
85%	1.2	1.2	0.0	222	0.0	0.0	261.6	1,681.9	0.76

**Table A.10 Total blacknose shark mortality under different non-blacknose SCS quota reductions for alternative A3.**

<b>A</b> Reduction in Non- Blacknose SCS Quota	<b>B</b> Blacknose allowance (number of sharks)	<b>C</b> Blacknose allowance (lb dw)	<b>D</b> Total Mortality Under A3 (lb dw)	<b>E</b> Total Mortality Under A3 (number of sharks)	<b>F</b> Difference Between allowance and Total Mortality (lb dw)	<b>G</b> Difference Between allowance and Total Mortality (number of sharks)	<b>H</b> SCS Quota (mt dw)	<b>I</b> Blacknose Quota (mt dw)
40%	7,094	94,135	53,101.6	8,258	41,033.4	-1,164	133.0	23.8
45%	7,094	94,135	48,939.5	7,611	45,195.6	-517	121.9	21.8
50%	7,094	94,135	44,777.3	6,964	49,357.8	130	110.8	19.9
55%	7,094	94,135	40,615.2	6,317	53,519.9	778	99.7	17.9
60%	7,094	94,135	36,453.0	5,669	57,682.1	1,425	88.7	16.0
65%	7,094	94,135	32,290.8	5,022	61,844.2	2,072	77.6	14.0
70%	7,094	94,135	28,128.7	4,375	66,006.4	2,719	66.5	12.1
75%	7,094	94,135	23,966.5	3,727	70,168.6	3,367	55.4	10.1
80%	7,094	94,135	19,804.3	3,080	74,330.7	4,014	44.3	8.2

**Table A.11 Total blacknose shark mortality under different non-blacknose SCS quota reductions for alternative A4.**

<b>A</b> Reduction in Non- Blacknose SCS Quota	<b>B</b> Blacknose allowance (number of sharks)	<b>C</b> Blacknose allowance (lb dw)	<b>D</b> Total Mortality Under A4 (lb dw)	<b>E</b> Total Mortality Under A4 (number of sharks)	<b>F</b> Difference Between allowance and Total Mortality (lb dw)	<b>G</b> Difference Between allowance and Total Mortality (number of sharks)	<b>H</b> SCS Quota (mt dw)	<b>I</b> Blacknose Quota (mt dw)
50%	7,094	38,421	68,558.6	12,696	-30,137.5	-5,602	110.8	31.1
55%	7,094	38,421	61,870.9	11,458	-23,449.8	-4,364	99.7	28.1
60%	7,094	38,421	55,183.3	10,219	-16,762.1	-3,125	88.7	25.0
70%	7,094	38,421	41,807.9	7,742	-3,386.8	-648	66.5	19.0
75%	7,094	38,421	35,406.4	6,557	3,014.7	537	55.4	15.9
76%	7,094	38,421	34,124.9	6,319	4,296.2	775	53.2	15.3
78%	7,094	38,421	31,561.9	5,845	6,859.2	1,249	48.8	14.1
80%	7,094	38,421	28,999.0	5,370	9,422.1	1,724	44.3	12.9
85%	7,09	38,421	22,591.6	4,184	15,829.5	2,910	33.2	9.9

#### **A.4 Alternative A6**

Alternative A6 is a composite alternative combining elements of alternatives A2 and A3. This alternative would establish a new non-blacknose SCS quota of 212.6 mt dw, which is equal to the average annual landings for the non-blacknose SCS fishery from 2004 through 2008, and an individual blacknose shark quota of 19.9 mt dw (43,872 lb dw), which would be a 64 percent reduction in blacknose shark landings relative to average landings from 2004 – 2008 of 55 mt dw.

Based on public comments and recent analysis of the 2005 – 2008 Shark Gillnet Observer Data, it appears that gillnet fishermen can selectively target different shark species with gillnet

gear, and minimize the mortality of blacknose sharks (and other protected species). Thus, elimination of gillnets as an authorized gear in the Atlantic shark fishery would not achieve a conservation and management objective necessary to rebuilding the blacknose shark. Therefore, contrary to the DEIS, NMFS would not prohibit gillnets as an authorized gear for sharks under alternative A6, and would continue to allow retention of blacknose sharks by incidental permit holders.

Alternative A6 would be implemented under a framework mechanism, which would be based on the gillnet shark fishermen's ability to avoid, or not avoid, catching blacknose sharks. The framework would be based on a ratio determined through revised data that indicates 20 mt dw of blacknose sharks would be harvested during the course of harvesting 110 mt dw of non-blacknose SCS (alternative A3). This framework mechanism would give NMFS the flexibility to increase or decrease either the blacknose or non-blacknose SCS quotas based on the ability of fishermen to avoid blacknose sharks and target non-blacknose SCS, and any subsequent change in status based on new stock assessments of these species of sharks.

**APPENDIX B TABLE OF CONTENTS**

**Appendix B Table of Contents.....B-i**

B.1 Southern Shrimp Alliance’s Scoping Comments Entitled “Elements of Blacknose Shark Assessment that Warrant Reconsideration”.....B-1

B.2 Office of Sustainable Fisheries’ Request for SEFSC Assistance with Response to Southern Shrimp Alliance’s Comments Entitled “Elements of Blacknose Shark Assessment that Warrant Reconsideration”.....B-9

B.3 SEFSC’s Response to Office of Sustainable Fisheries’ Request for SEFSC Assistance with Response to Southern Shrimp Alliance’s Comments and Additional Blacknose Shark Analyses.....B-11

B.4 SEFSC’s Response to Southern Shrimp Alliance’s Comments Entitled “Elements of Blacknose Shark Assessment that Warrant Reconsideration”.....B-13

B.5 Results of Sensitivity Analyses for Reduction in Blacknose Bycatch in Shrimp Trawls.....B-23





# Southern Shrimp Alliance, Inc

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November 14, 2008

Karyl Brewster-Geisz  
HMS Management Division F/SF1  
National Marine Fisheries Service  
1315 East West Highway  
Silver Spring, MD 20910

RE: Scoping Comments on Amendment 3 to the HMS FMP

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The Southern Shrimp Alliance (SSA) appreciates the opportunity to provide the following scoping comments on Amendment 3 to the Highly Migratory Species (HMS) Fishery Management Plan (FMP).

SSA has enjoyed a very constructive relationship with the National Marine Fisheries Service (NMFS) in addressing difficult conservation challenges facing the US shrimp fisheries. Working together we have achieved a number of mutually beneficial results including red snapper bycatch conservation in the Gulf of Mexico and deep sea coral habitat protection in the South Atlantic. Like those issues, we look forward to working cooperatively with the Agency in addressing the blacknose shark conservation issues raised by the Agency's determination that this stock is overfished and overfishing is occurring.

Although a product of peer review, we have a number of concerns with the data inputs, assumptions and analyses associated with the 2007 SEDAR stock assessment for blacknose sharks. These issues relate both to the estimates of bycatch attributed to the shrimp fishery and some elements of the stock assessment itself. These issues do not appear trivial and if carefully revisited by the Agency's scientific staff, may well result in significant changes to these bycatch estimates and the resulting status determination of the stock. Before addressing any management options that may be required for the shrimp fisheries, we feel strongly that a cooperative effort to reconsider these scientific issues is warranted. Therefore, we urge that Agency to enter into such a cooperative effort among government and non-government scientists with the objective of reaching consensus.

There follows an informal outline of a number of the scientific issues we have identified and which we hope will be addressed by such a scientific review. We appreciate your consideration and look forward to working with you.

Sincerely,

John Williams,  
Executive Director



# Southern Shrimp Alliance, Inc

## ELEMENTS OF BLACKNOSE SHARK ASSESSMENT THAT WARRANT RECONSIDERATION

---

### DATA INPUTS

- **SEAMAP Data**
  - Seasonal
    - Bycatch estimates are performed on a trimester basis but standard SEAMAP cruises are performed only in the 2<sup>nd</sup> and 3<sup>rd</sup> trimesters. There has been some sparse sampling in winter, but the winter estimate may not be very good.
  - Geographical
    - Blacknose shark abundance is highest in the eastern GOM (stat areas 1-9). However, SEAMAP cruises are not routinely conducted in stat areas 1-9, but are conducted in the western GOM areas 10-21. This raises question as to the validity of SEAMAP data to this species.
    - The author of the SEAMAP abundance indices (Nichols) indicated that his model was not “as satisfactory” for species such as blacknose sharks which occur mainly in the eastern GOM as compared to the western GOM where SEAMAP cruises are typically conducted. He also discusses the high cost of imbalanced sampling where the entire range is not sampled. This seems to cast uncertainty on the blacknose shark assessment.
  - Day/Night data
    - Blacknose sharks were taken at depths between 10 and 40 fathoms in the fall SEAMAP studies and between 5 and 50 fathoms in the summer SEAMAP studies. . In the western GOM, these depths are fished by the brown shrimp fishery which is a night fishery. In the eastern GOM, these depths are used by the pink shrimp fishery which is also a night fishery.
    - The SEAMAP data used in the assessment combines catch data for trawls conducted at both night and day. The SEAMAP day trawl blacknose shark catch rate was stated to be 15 times greater than the night trawl catch rate. Only the night trawl data is applicable to the fisheries in question. Therefore, the catch rates used in the assessment are likely much higher than what actually occur in the fisheries.
  - Bycatch reduction from TEDs
    - The Georgia Bulldog video strongly suggests that TEDs are effective in excluding a substantial number of the sharks entering the net. It appears that the video includes

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portions during which the net was equipped with the older small TED and portions with the newer larger TED now required for use in our fisheries. Our preliminary review indicates that of the portion where the new larger TED was used, approximate 12 out of 17 sharks (70%) were excluded from the net. This is critical information because SEAMAP nets are not equipped with any TED design and yet SEAMAP data was a major source of data used in the assessment. All shrimp trawl nets operating in the brown and pink shrimp fisheries are equipped with TEDs. Therefore, the number of takes of blacknose sharks in the SEAMAP cruises used in the assessment are likely much higher than what actually occur in the fisheries. (See section on “shrimp trawl video” below)

- Sample size
  - The assessment uses a correlation between a very small sample size of SEAMAP takes (273) and observed takes (27) as a predictor of shrimp trawl bycatch. Validity?
- **Observer Data**
  - Relevance of data to current fishery (age of data)
    - The NMFS observer data used in the assessment is primarily from the 1970s and 1980s shrimp trawl fishery. Only 11 takes of blacknose sharks have been observed in that past 16 years (since 1992). Validity of observer data?
- **Shrimp Trawl Fishing Effort Data**
  - Most Current ?
    - It does not appear that the stock assessment used the most current shrimp trawl fishing effort data.
    - What was the benchmark period used in the assessment for the bycatch estimates?
    - Shrimp trawl fishing effort in the 10-30fm zone in the western GOM (stat areas 10-21) has been reduced by approximately 78 to 80 percent since 2001-2003. Shrimp trawl fishing effort in the eastern GOM has also been reduced by 79 percent. Therefore, the estimates of shrimp trawl bycatch used in the assessment may be significantly higher than what is actually occurring in the fisheries.

## LIFE HISTORY ASSUMPTIONS

- **Fecundity**
  - The assessment notes that blacknose sharks in the South Atlantic reproduce every 2 years and that blacknose sharks in the GOM reproduce every year. This is confirmed in the scientific literature.
  - The assessment further notes there were difficulties in running the model using the 2 year assumption for the South Atlantic. Consequently, the assessment scientists

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chose to use an average of the two and thereby assumed that blacknose sharks reproduce every 1.5 years in both the GOM and South Atlantic.

- The assumption that reproduction occurs every 1.5 years instead of 1 year in the GOM is likely to have a substantial impact on the intrinsic rate of population increase ( $r$ ) for the stock. This represents a 33% reduction in the spawning stock fecundity which is a principal measure used for the stock status determination. In other words, the population rate of growth and recruitment used in the assessment is likely to be much lower than what is actually occurring in the GOM population. Consequently, the assessment's conclusions about the status of the blacknose shark are likely to be overly pessimistic.
- **Distribution**
  - SEAMAP data indicates that since 1972 only 273 blacknose sharks were caught in 15,652 tows and that blacknose sharks were present in less than 1 percent of the SEAMAP stations. SEAMAP cruises are conducted in the western GOM. This low number of interactions indicates that the western GOM is not within the primary range of this species. This calls into question the validity of using SEAMAP data for this assessment.

## CHOICE OF ASSESSMENT MODEL AND METHODS

The assessment indicates that different models/methods produced different results. The figure of page 16 of the SEDAR Review Panel report indicates that one method resulted in the stock status determination of overfished and overfishing is occurring and the other did not. The model chosen was that which resulted in the overfished/overfishing determination. Neither model produced good fits to the abundance indices. There is also discussion in the Review Panel Report regarding how the age-structured approach fit all of the catch data well except the shrimp bycatch data. And, there are a number of points made about how the results of this assessment may change considerably in the next assessment. This lack of consistency between models begs explanation and suggests uncertainty.

## OTHER DATA & ANALYTICAL ISSUES

- **Fish Size & Mortality Assumptions**
  - The assessment appears to use an assumption that blacknose sharks taken in all commercial fisheries average 4.97 lbs dw, and that blacknose sharks taken in all recreational fisheries average 1.5 lbs dw.
    - What is the source of these average fish size assumptions for both commercial and recreational fisheries?

# Southern Shrimp Alliance, Inc

- The assessment presents data indicating that the recreational fisheries landed (killed) 10,408 blacknose sharks. Why would recreational anglers land (kill) sharks that only weigh 1.5 lbs instead of releasing them? Is this really happening or is a product of extrapolation? This really calls into question the validity of the average fish size assumption for recreational fisheries.
- Does the Georgia Bulldog video confirm that a reasonable estimate of the average size of sharks which pass through the TED into the cod end of the net is 4.97 lbs? Our preliminary review suggests that the sharks that pass through the TED and into the net are smaller than 4.97 lbs dw. If the average size of sharks is significantly smaller than 4.97 lb dw, this could have a major impact on the fishing mortality rate for shrimp trawl bycatch. This, in turn, could have a significant impact on the stock status determination.
- The assessment appears to assume that catch = 100% mortality in the commercial fisheries. Does catch = 100% mortality in the commercial fisheries including the shrimp trawl fishery? What is the post-release survival of discarded sharks in these fisheries? If survival is greater than 0 percent than the assessment may be overly pessimistic.
- Does the assessment assume the same fishing mortality rate (F) for 1.5 lb fish taken in the recreational fisheries and 4.97 lb fish taken in the commercial fisheries? In reality, there is likely to be a substantial difference in the F rate associated with these different average sizes (ages).
- What is the sensitivity of the model to differences in each of the assumptions discussed above?

- **SEDAR 13 Review Panel Report Issues**

- Natural Mortality
  - On page 14 of the Report there is a discussion of the natural mortality rate assumption being the highest pup survival (ie. low M). Is this a valid or reasonable assumption? The choice of M can have a major impact on the assessment results in terms of stock status. Sensitivity analyses need to be conducted using a plausible range of M values.
- Indices of Abundance
  - The discussion at the bottom of page 14 of the Report seems to suggest that there are serious problems with the selected indices because they cannot all account for the condition of the stock. There is a question of whether the

# Southern Shrimp Alliance, Inc

stock unit is properly defined and a recommendation for using subsets in the future.

- Gear Selectivity
    - The Report indicates that the method used to estimate gear selectivity was “relatively crude” and there was insufficient information for the reviewers to determine if this approach was adequate or not. (see top of p. 15)
  
  - In General
    - How do the following statements in the SEDAR 13 Review Panel Report support the need for a timely review and revision of the current stock assessment? (bold added)
- (1) **“Executive Summary:** For **blacknose sharks**, appropriate standard assessment methods based on general production models and on age-structured modeling were used to derive management benchmarks. The current assessment indicates that spawning stock fecundity (SSF) in 2005 and during 2001-2005 is smaller than SSF<sub>msy</sub>, i.e. that blacknose shark are overfished. The estimate of fishing mortality rate in 2005 and the average for 2001-2005 is greater than F<sub>msy</sub>, and the ratio is substantially greater than 1 in both cases. Thus, overfishing was occurring and is likely still occurring. **However, because of uncertainties in indices, catches and life history parameters, the status of blacknose shark could change substantially in the next assessment in an unpredictable direction.”** (See p. 2)
- (2) **“Schedule for the next assessment of blacknose:** the current stock status indicates that blacknose shark is being overfished and that overfishing is occurring. Thus, **it would be wise to reassess this stock within two or three years. Users of the assessment results should be aware that major differences in the estimated status could be expected in the next assessment if consistent subsets of stock size indices were used. In the current assessment, the stock size indices used are conflicting, and the assessment model takes an average of all the indices. If separate assessments were done with the indices that indicated increases, those that indicated stability, and those that indicated decreases, this would show greater uncertainty in stock status and stock trends.”** (See p.19)

SHRIMP TRAWL VIDEO

# Southern Shrimp Alliance, Inc

- NMFS HMS Division has distributed a video as part of their scoping presentations to the Councils as supporting evidence that sharks are caught as bycatch in the shrimp trawl fisheries.
- According to NMFS HMS Division:

“The footage was shot off the coast of Georgia from the R/V Georgia Bulldog. It is a confiscated shrimp trawler operated by the University of Georgia Marine Extension Service. Most of the footage was within 10 miles of shore, in water depths less than 40 feet. All the footage was using TEDs with less than 4 inch bar spacing. There has been no analysis of the shark catch. This work was primarily done to test these TEDs for wild turtle exclusion, and the SEFSC was not working up or identifying the bycatch. However, the SEFC noted that most of these sharks appear to be approximately 2 ½ feet long.”
- The video appears to indicate that a very significant number (~70% ) of the sharks that enter the net are expelled through the new, large TED opening.
- The SEDAR assessment of blacknose shark (and other coastal sharks) relied heavily on SEAMAP data to estimate shark bycatch in shrimp trawl fisheries. The SEAMAP trawl net is not equipped with a TED. Thus, it appears that the assessment did not account for what appears to be a very substantial shark bycatch reduction effect of TEDs used in 100% of the current brown and pink fisheries where blacknose shark bycatch can occur. If this is true, then the assessment is likely to be overly pessimistic.
- The SEDAR assessment also assumed the average weight of sharks caught in shrimp trawl fisheries was 4.97 lb dw. Is it possible to estimate size of sharks that passed through the TED bars into the cod end of the net used in the video to confirm if that is consistent with 4.97 lb dw assumption in assessment?
- Is there any data that can be retrieved from the Georgia Bulldog testing cruises to determine the mortality/survival rates of sharks found in the cod end? Any species identification possible?



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL MARINE FISHERIES SERVICE  
Silver Spring, MD 20910

Dr. Bonnie Ponwith  
Director,  
Southeast Fisheries Science Center  
75 Virginia Beach Drive  
Miami, FL 33149

**MAR 27 2009**

Dear Dr. Ponwith,

As you are aware, the Highly Migratory Species (HMS) Management Division is in the process of writing a draft Environmental Impact Statement (EIS) and proposed rule that would implement measures to rebuild overfished stocks and end overfishing of Atlantic shark stocks per the recent small coastal shark assessments completed in 2007.

For this rulemaking, the HMS Management Division released a scoping presentation and request for comments on the EIS on July 2, 2008 (73 FR 37932). The Southern Shrimp Alliance (SSA) provided a comment on the scoping presentation dated November 14, 2008. In their comment was a section entitled "Elements of Blacknose Shark Assessment that Warrant Reconsideration" that contained several comments regarding SEDAR 13 as well as comments regarding a shrimp trawl video that was made by the Southeast Fisheries Science Center (SEFSC) in Pascagoula, Mississippi, and distributed to interested parties by the HMS Management Division. The HMS Management Division distributed this video to simply show that small sharks can go through the turtle exclusion devices (TEDs) found on commercial shrimp trawls.

On February 10, 2009, the HMS Management Division released a Predraft summarizing the comments received during scoping. Some of the SSA comments on the stock assessment were addressed in the Predraft; however, the SSA submitted another comment on March 16, 2009, regarding the Predraft. Their comment included additional analyses on the shrimp trawl video and the shrimp bycatch model used in SEDAR 13. In their March 16, 2009, comment, the SSA stated that the section of the Predraft that responded to their scoping comments regarding SEDAR 13 was not "consistent with the prevailing scientific understanding of the issues raised." In addition, the SSA submitted a powerpoint/report entitled "Potential Effects of Turtle Excluder Devices on Bycatch of Blacknose Sharks." The SSA states that the "report has been submitted by the authors to the SEFSC. It strongly suggests that the blacknose bycatch estimate for the shrimp trawl fisheries that was used in the SEDAR 13 stock assessment did not adequately account for the substantial blacknose shark bycatch reduction effect of TED's currently deployed in the shrimp trawl fisheries. Consequently, the bycatch estimate used in the stock assessment is likely substantially higher than what is actually occurring in the fisheries." The SSA also submitted a datasheet and a report entitled "A Review of Submersible Video Depicting Shark Interaction with various TED types," which analyzes the shrimp trawl video showing interactions of sea turtles, finfish, and sharks with TEDs in the South Atlantic.

Given the many concerns expressed regarding the methods and results derived from the SEDAR 13 assessments on small coastal sharks, I am writing to seek assistance from the SEFSC in



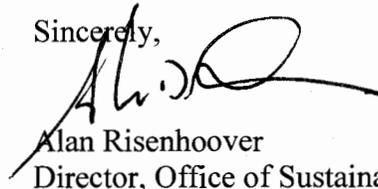
drafting a response to the November 14, 2008, and March 16, 2009, comments submitted by the SSA. During the Amendment 2 rulemaking, I made a similar request regarding comments we received from Rusty Hudson and Dr. Frank Hester. The response we received from the SEFSC was helpful not only in responding to the comments but also for my staff in analyzing the different management measures.

I feel that a response by the SEFSC in this instance is required given your staff's familiarity with the data and methodology employed during the SEDAR 13 assessments. The SEFSC staff's expertise is needed to address the technical comments raised by the SSA regarding SEDAR 13 in their November 14, 2008, comment (and in particular, the section entitled "Elements of Blacknose Shark Assessment that Warrant Reconsideration), and the alternate analysis proposed in the reported entitled "Potential Effects of Turtle Excluder Devices on Bycatch of Blacknose Sharks." The comments and documents referenced above have already been sent to Katie Andrews, John Carlson, and Enric Cortés.

Furthermore, as we begin conducting analyses of the ecological impacts of the measures considered in the amendment, collaboration with Enric and Katie may be necessary to ensure that data and methods are consistent with past analyses conducted by the SEFSC.

If you have any questions or concerns regarding these requests, please contact Margo Schulze-Haugen, Chief of the HMS Management Division, at (301) 713-2347. I look forward to collaborating with you on this and future endeavors.

Sincerely,



Alan Risenhoover  
Director, Office of Sustainable Fisheries

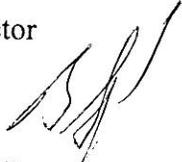
Cc: Roy Crabtree, Assistant Administrator, Southeast Regional Office  
Cc: Guy Davenport, Director, Southeast Fisheries Science Center, Panama City Laboratory  
Cc: Katie Andrews, Panama City Laboratory  
Cc: Enric Cortés, Panama City Laboratory  
Cc: John Carlson, Panama City Laboratory



**UNITED STATE DEPARTMENT OF COMMERCE**  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
Southeast Fisheries Science Center  
75 Virginia Beach Drive  
Miami, Florida 33149 U.S.A.

June 2, 2009

MEMORANDUM TO: Alan Risenhoover, Sustainable Fisheries Director

FROM: Bonnie Ponwith, Southeast Fisheries Director 

SUBJECT: HMS letter dated 3/27/2009 and conference call on 5/1/2009  
requesting additional analyses for blacknose sharks

Attached are two documents in response to 1) the letter you sent on 3/27/2009 seeking SEFSC assistance in responding to SSA comments and 2) the request made during the conference call held on 5/1/2009.

Regarding (1), in document "SEFSC response to comments from SSA for HMS.doc", we have specifically addressed all scientific and technical issues raised in the SSA document "Comments on HMS A3 scoping blacknose sharks 11-14-08.doc". Additional relevant technical comments made by the SSA in document "Comments on HMS Pre-draft A3 blacknose sharks 3-16-09.docx" and other attachments distributed by Jackie Wilson from HMS are essentially addressed in our response or are being addressed through a collaborative effort with LGL Ecological Associates.

Regarding (2), the request to carry out additional analyses to assess the influence that different assumptions on the level of bycatch reduction may have on blacknose shark stock status, we ran three scenarios in which the shrimp bycatch series from the baseline stock assessment conducted in 2007 was reduced by 25%, 50% and 75%, respectively, to account for the introduction of TEDs in the shrimp trawl fishery starting in 1990. The attached spreadsheet ("Blacknose shark assessment scenarios with bycatch reduction.xls" summarizes the results of the new model runs. Essentially, there is no change in stock status (see cells highlighted in blue,  $F_{2005}/F_{MSY}$  and  $N_{2005}/N_{MSY}$ ). Although stock status improves, despite reductions of 25% to 75% in shrimp bycatch, the stock continues to be overfished ( $N_{2005}/N_{MSY}=0.66$  to  $0.74$  vs.  $0.48$  in the baseline assessment run from the 2007 blacknose shark stock assessment) and overfishing is still occurring ( $F_{2005}/F_{MSY}=2.67$  to  $2.21$  vs.  $3.77$  in the baseline assessment run from the 2007 blacknose shark stock assessment). For reference, the anticipated post-TED (1990 on) reduction in bycatch from the model currently in development is approximately 50%.

Let us know if you need clarification on any of our answers to the comments posed by the SSA or on the results of the additional assessment runs.

Attachments

Cc: Roy Crabtree

**SEFSC response to comments from Southern Shrimp Alliance  
on blacknose shark bycatch and assessment**

by Drs. Katie Andrews and Enric Cortés

Below are our responses to technical comments submitted by the Southern Shrimp Alliance (SSA) to the NMFS HMS Division in document “Comments on HMS A3 Scoping blacknose sharks 11-14-08.docx”. Comments follow the question text as copied from the SSA document.

## **ELEMENTS OF BLACKNOSE SHARK ASSESSMENT THAT WARRANT RECONSIDERATION**

---

### DATA INPUTS

- **SEAMAP Data**

- Seasonal

- Q: Bycatch estimates are performed on a trimester basis but standard SEAMAP cruises are performed only in the 2<sup>nd</sup> and 3<sup>rd</sup> trimesters. There has been some sparse sampling in winter, but the winter estimate may not be very good.

A: Bycatch estimates are provided on an annual scale, but trimester estimates are available if needed. The comment was that the winter estimates may not be very good because there is sparse sampling in winter (i.e. no SEAMAP data). The data are sparse for the bycatch estimates in general. This may lead to an over or underestimation of bycatch depending on the encounter rate. When there are no SEAMAP data, the observer data are used alone to provide the estimate, therefore it is the best science available given the data.

- Geographical

- Q: Blacknose shark abundance is highest in the eastern GOM (stat areas 1-9). However, SEAMAP cruises are not routinely conducted in stat areas 1-9, but are conducted in the western GOM areas 10-21. This raises question as to the validity of SEAMAP data to this species.

A: We do not know of any sources that verify that blacknose abundance is greater in the eastern GOM than the western GOM. The SEAMAP data supplement the sparse observer data in the GOM. Since the SEAMAP data cover half the GOM spatially, they are valid data for such a calculation.

- Q: The author of the SEAMAP abundance indices (Nichols) indicated that his model was not “as satisfactory” for species such as blacknose sharks which occur mainly in the eastern GOM as compared to the western GOM where SEAMAP cruises are typically conducted. He also discusses the high cost of imbalanced sampling where the entire range is not sampled. This seems to cast uncertainty on the blacknose shark assessment.

A: The question raised is whether SEAMAP data are valid for blacknose shark assessment. The SEAMAP data presented by Nichols were not used to provide an estimate of relative abundance for the assessment (i.e. CPUE) because they were not accepted by the WG; they were used to provide bycatch estimates only.

- Day/Night data

- Q: Blacknose sharks were taken at depths between 10 and 40 fathoms in the fall SEAMAP studies and between 5 and 50 fathoms in the summer SEAMAP studies. In the western GOM, these depths are fished by the brown shrimp fishery which is a night fishery. In the eastern GOM, these depths are used by the pink shrimp fishery which is also a night fishery. The SEAMAP data used in the assessment combines catch data for trawls conducted at both night and day. The SEAMAP day trawl blacknose shark catch rate was stated to be 15 times greater than the night trawl catch rate. Only the night trawl data is applicable to the fisheries in question. Therefore, the catch rates used in the assessment are likely much higher than what actually occur in the fisheries.

A: The factor, *depth*, is included in the model to estimate bycatch in the shrimp fishery rather than a *day/night* factor. There are data we plan to use to determine the proportion of shrimping that occurs during the day versus night. We also plan to re-examine *depth* simultaneously to determine if *day/night* would better describe the distribution of shrimping effort in the GOM.

- Bycatch reduction from TEDs

- Q: The Georgia Bulldog video strongly suggests that TEDs are effective in excluding a substantial number of the sharks entering the net. It appears that the video includes portions during which the net was equipped with the older small TED and portions with the newer larger TED now required for use in our fisheries. Our preliminary review indicates that of the portion where the new larger TED was used, approximate 12 out of 17 sharks (70%) were excluded from the net. This is critical information because SEAMAP nets are not equipped with any TED design and yet SEAMAP data was a major source of data used in the assessment. All shrimp trawl nets operating in the brown and pink shrimp fisheries are equipped with TEDs. Therefore, the number of takes of than what actually occur in the fisheries. (See section on “shrimp trawl video” below)

A: It is apparent that TEDs reduce, but do not eliminate, the number of sharks that are caught as bycatch in the shrimp fishery. We are currently working with consultants from LGL Ecological Associates to explicitly incorporate a TED effect into the bycatch estimation model. Also, we repeat that SEAMAP data were only used in shrimp trawl bycatch estimation, not as a CPUE time series or any other data inputs used in the stock assessment.

- Sample size

- Q: The assessment uses a correlation between a very small sample size of SEAMAP takes (273) and observed takes (27) as a predictor of shrimp trawl bycatch. Validity?

A: Using the SEAMAP data and observer data to estimate the number of blacknose sharks captured as bycatch is not only valid, but also warranted. It is widely accepted that a considerable amount of bycatch of a number of species are taken by the shrimp trawl nets. That bycatch must be quantified. It is more difficult to provide robust estimates with limited data, but we are using the best available science to analyze the data that are available.

- **Observer Data**

- Relevance of data to current fishery (age of data)

- Q: The NMFS observer data used in the assessment is primarily from the 1970s and 1980s shrimp trawl fishery. Only 11 takes of blacknose sharks have been observed in that past 16 years (since 1992). Validity of observer data?

A: The observer data are a valid source of information about the bycatch in the shrimp fishery and cover the entire modern time series of the assessment model (1972-2005). The low number of observed blacknose are much more likely due to observers not being required to record sharks to species for the majority of the time there has been an observer program. Also, there is approximately 1% coverage in the fishery, and that number should be greatly increased in order to provide a better picture of what is caught as bycatch.

- **Shrimp Trawl Fishing Effort Data**

Most Current ?

- Q: It does not appear that the stock assessment used the most current shrimp trawl fishing effort data.
- Q: What was the benchmark period used in the assessment for the bycatch estimates?
- Q: Shrimp trawl fishing effort in the 10-30fm zone in the western GOM (stat areas 10-21) has been reduced by approximately 78 to 80 percent since 2001-2003. Shrimp trawl fishing effort in the eastern GOM has also been reduced by 79 percent. Therefore, the estimates of shrimp trawl bycatch used in the assessment may be significantly higher than what is actually occurring in the fisheries.

A: The shrimp trawl effort data used were current at the time of the assessment. The years of effort data available were 1981-2006, but we only used the data through 2005 to match all the other inputs of the assessment. Keep in mind that the assessment began in 2006 and concluded in 2007.

## LIFE HISTORY ASSUMPTIONS

- **Fecundity**

- Q: The assessment notes that blacknose sharks in the South Atlantic reproduce every 2 years and that blacknose sharks in the GOM reproduce every year. This is confirmed in the scientific literature.

- Q: The assessment further notes there were difficulties in running the model using the 2 year assumption for the South Atlantic. Consequently, the assessment scientists chose to use an average of the two and thereby assumed that blacknose sharks reproduce every 1.5 years in both the GOM and South Atlantic.
- Q: The assumption that reproduction occurs every 1.5 years instead of 1 year in the GOM is likely to have a substantial impact on the intrinsic rate of population increase ( $r$ ) for the stock. This represents a 33% reduction in the spawning stock fecundity which is a principal measure used for the stock status determination. In other words, the population rate of growth and recruitment used in the assessment is likely to be much lower than what is actually occurring in the GOM population. Consequently, the assessment's conclusions about the status of the blacknose shark are likely to be overly pessimistic.

A: Assuming a combined reproductive cycle of 1.5 years for the GOM and South Atlantic (SA) was decided at the Data Workshop (DW). The rationale for this decision, as explained in the DW report, was that genetic data were not conclusive despite reproductive cycles appearing to be different in the two areas. The growth model used was also a composite for the two areas (GOM and SA) because of the lack of younger individuals in the growth model from the SA and the lack of larger animals from the GOM. As a result, combined maturity ogives for the two areas were also used. Average litter size for the areas combined was 3.3 pups per litter. Assuming a 2-year reproductive cycle for blacknose sharks in the SA with the other life history inputs resulted in a negative population growth rate in a demographic model, which the WG deemed as unlikely. Hence, the WG decided to use the 1.5-year reproductive cycle for the two areas combined. Assuming a 1-yr, as opposed to a 1.5-yr, reproductive cycle obviously increases the reproductive output. However, a sensitivity analysis incorporating a 1-yr reproductive cycle had little effect on stock status criteria (scenario S3 in Table 4.4. of stock assessment).

- **Distribution**

- Q: SEAMAP data indicates that since 1972 only 273 blacknose sharks were caught in 15,652 tows and that blacknose sharks were present in less than 1 percent of the SEAMAP stations. SEAMAP cruises are conducted in the western GOM. This low number of interactions indicates that the western GOM is not within the primary range of this species. This calls into question the validity of using SEAMAP data for this assessment.

A: The SEAMAP data were not used as an estimate of relative abundance in the stock assessment, so this concern does not apply.

## CHOICE OF ASSESSMENT MODEL AND METHODS

Q: The assessment indicates that different models/methods produced different results. The figure of page 16 of the SEDAR Review Panel report indicates that one method resulted in the

stock status determination of overfished and overfishing is occurring and the other did not. The model chosen was that which resulted in the overfished/overfishing determination. Neither model produced good fits to the abundance indices. There is also discussion in the Review Panel Report regarding how the age-structured approach fit all of the catch data well except the shrimp bycatch data. And, there are a number of points made about how the results of this assessment may change considerably in the next assessment. This lack of consistency between models begs explanation and suggests uncertainty.

A: Uncertainty is pervasive in all stock assessments. The WG opted for the age-structured production model as the “best” model to assess the status of blacknose sharks because it allows more direct incorporation of biological and fishery data than biomass dynamic models. The choice was done prior to running the assessment models. However, as was noted in the Assessment and Review Panel reports (e.g., see phase plot on page 18 of Review Panel report), some of the surplus production models also resulted in an overfished stock status (Bayesian Surplus Model using inverse CV weighting and the WinBUGS state-space model) and overfishing (Bayesian Surplus Model using inverse CV weighting). As noted by the reviewers, results may change if different subsets of relative abundance indices are chosen, but that is true for most stock assessments. Part of the reason for having SEDAR meetings is to convene a group of experts that choose the indices more likely to reflect stock status based on a set of criteria. The assessment actually considered sensitivity analyses in which all CPUE indices were included or using an alternative weighting method, none of which resulted in any substantial change in stock status.

## OTHER DATA & ANALYTICAL ISSUES

- **Fish Size & Mortality Assumptions**

- Q: The assessment appears to use an assumption that blacknose sharks taken in all commercial fisheries average 4.97 lbs dw, and that blacknose sharks taken in all recreational fisheries average 1.5 lbs dw.
  - What is the source of these average fish size assumptions for both commercial and recreational fisheries?
  - The assessment presents data indicating that the recreational fisheries landed (killed) 10,408 blacknose sharks. Why would recreational anglers land (kill) sharks that only weigh 1.5 lbs instead of releasing them? Is this really happening or is a product of extrapolation? This really calls into question the validity of the average fish size assumption for recreational fisheries.
  - Does the Georgia Bulldog video confirm that a reasonable estimate of the average size of sharks which pass through the TED into the cod end of the net is 4.97 lbs? Our preliminary review suggests that the sharks that pass through the

TED and into the net are smaller than 4.97 lbs dw. If the average size of sharks is significantly smaller than 4.97 lb dw, this could have a major impact on the fishing mortality rate for shrimp trawl bycatch. This, in turn, could have a significant impact on the stock status determination.

- The assessment appears to assume that catch = 100% mortality in the commercial fisheries. Does catch = 100% mortality in the commercial fisheries including the shrimp trawl fishery? What is the post-release survival of discarded sharks in these fisheries? If survival is greater than 0 percent than the assessment may be overly pessimistic.
- Does the assessment assume the same fishing mortality rate (F) for 1.5 lb fish taken in the recreational fisheries and 4.97 lb fish taken in the commercial fisheries? In reality, there is likely to be a substantial difference in the F rate associated with these different average sizes (ages).
- What is the sensitivity of the model to differences in each of the assumptions discussed above?

A: There appear to be several misunderstandings or confusions in this section:

We are unsure of the source for the cited 4.97 lb dw average weight for blacknose sharks in the commercial fisheries. As explained in the DW report, the assessment unit is numbers. Table 4 in document SEDAR-13-DW15 shows the average weights used to transform commercial landings (not catches) from weight to numbers for 1995-2005. Average weights come from the shark bottom longline and drift gillnet observer programs. Recreational catches are reported in numbers so no average weights are used. Recreational catch estimates, as explained at length in the DW and other reports, come from the Marine Recreational Fishery Statistics Survey (MRFSS), the NMFS Headboat Survey, and the Texas Parks and Wildlife Department Recreational Survey and include fish retained and discarded dead. Very few animals are measured, but some length and weight information is available (e.g., see Table 9 in document SEDAR-13-DW15).

The sources of mortality from commercial fisheries in Table 4 of the assessment, also found in more detail in the DW report, correspond to *landings*, not catches. Hence, the inclusion separately of bottom longline discards (which come from observed proportions of sharks discarded dead). The bycatch estimates from the shrimp fishery are assumed to be 100% dead. It is very unlikely that any animals would survive capture in the codend. Also, according to observer reports, there is little effort to quickly return live bycatch to the sea.

The difference in fishing mortalities across fisheries comes from the use of fleet-specific selectivities. A different selectivity function was used for longlines, gillnets, etc. Those selectivity curves model the different sizes/ages that each fleet preferentially takes. The surplus production age-structured model estimates a separate  $F$  for each fleet (see equations 7 and 8 in stock assessment report).

- **SEDAR 13 Review Panel Report Issues**

- Q: Natural Mortality

- On page 14 of the Report there is a discussion of the natural mortality rate assumption being the highest pup survival (ie. low  $M$ ). Is this a valid or reasonable assumption? The choice of  $M$  can have a major impact on the assessment results in terms of stock status. Sensitivity analyses need to be conducted using a plausible range of  $M$  values.

A: The low estimates of  $M$  (high survival) used in the baseline demographic and stock assessment analyses are intended to simulate a more realistic, density-dependent response and result in higher production (higher  $r$ , higher spawning stock fecundity, etc.). Thus, any sensitivity analyses would necessarily include higher values of  $M$  (lower survivorship) resulting in a less productive stock and likely worsened stock status.  $M$  values were also age-specific (decreasing with increasing age), which is more realistic than using a fixed value of  $M$  for all ages.

- Q: Indices of Abundance

- The discussion at the bottom of page 14 of the Report seems to suggest that there are serious problems with the selected indices because they cannot all account for the condition of the stock. There is a question of whether the stock unit is properly defined and a recommendation for using subsets in the future.

A: The reviewers' advice was that consistent subsets of indices be used to counteract the mixed signals given by multiple, contradicting indices. As of the SEDAR 13 Data Workshop, there was no formal protocol for accepting or rejecting indices of abundance. The WG did so as objectively as possible, and the indices that were used in the assessment were the best available information about the stock at the time based on several selection criteria mentioned earlier. The WG selected those indices to be included in the assessment by considering both positive and negative aspects of each index as well as its perceived utility for the assessment (see Table 3.1 in Data Workshop Report). All selected indices were statistically standardized with GLM techniques. Note also that a sensitivity analysis incorporating all available indices resulted in no change in stock status (scenario S1 in Table 4.4. of stock assessment).

We do not think that using only the increasing or only the decreasing indices is appropriate. The decision to use an index should be made regardless of whether it shows a positive or negative trend over time. The assessment then, in turn, quantifies the stock based on the collection of accepted indices.

- Q: Gear Selectivity

- The Report indicates that the method used to estimate gear selectivity was “relatively crude” and there was insufficient information for the reviewers to determine if this approach was adequate or not. (see top of p. 15)

A: The procedure for estimating gear-specific selectivity was briefly described on page 27 of the DW report. After examination of the length frequency data presented at the DW, age-length keys were used to transform length frequencies into age frequencies, from which gear-specific selectivity was estimated prior to the AW using the methodology mentioned. The method for estimating selectivity is explained in detail in document SEDAR-13-AW-02, which was also distributed to the peer reviewers. As to the quality and quantity of the data, the reviewers were presented the attached Powerpoint presentation to explain in detail what was written in the report. The method was accepted by the reviewers as the best method available given the data.

- Q: In General

- How do the following statements in the SEDAR 13 Review Panel Report support the need for a timely review and revision of the current stock assessment? (bold added)

(1) **“Executive Summary: For blacknose sharks, appropriate standard assessment methods based on general production models and on age-structured modeling were used to derive management benchmarks. The current assessment indicates that spawning stock fecundity (SSF) in 2005 and during 2001-2005 is smaller than SSF<sub>msy</sub>, i.e. that blacknose shark are overfished. The estimate of fishing mortality rate in 2005 and the average for 2001-2005 is greater than F<sub>msy</sub>, and the ratio is substantially greater than 1 in both cases. Thus, overfishing was occurring and is likely still occurring. However, because of uncertainties in indices, catches and life history parameters, the status of blacknose shark could change substantially in the next assessment in an unpredictable direction.”**  
(See p. 2)

(2) **“Schedule for the next assessment of blacknose: the current stock status indicates that blacknose shark is being overfished and that overfishing is occurring. Thus, it would be wise to reassess this stock within two or three years. Users of the assessment results should be aware that major differences in the estimated status could be expected in the next assessment if consistent subsets of stock size indices were used. In the current assessment, the stock size indices used**

**are conflicting, and the assessment model takes an average of all the indices. If separate assessments were done with the indices that indicated increases, those that indicated stability, and those that indicated decreases, this would show greater uncertainty in stock status and stock trends.” (See p.19)**

A: The blacknose assessment and that for the other small coastal sharks was completed in 2007; thus an updated or benchmark assessment scheduled for 2010 would fall within the three-year timeframe mentioned.

#### Q: SHRIMP TRAWL VIDEO

- NMFS HMS Division has distributed a video as part of their scoping presentations to the Councils as supporting evidence that sharks are caught as bycatch in the shrimp trawl fisheries.
- According to NMFS HMS Division:

“The footage was shot off the coast of Georgia from the R/V Georgia Bulldog. It is a confiscated shrimp trawler operated by the University of Georgia Marine Extension Service. Most of the footage was within 10 miles of shore, in water depths less than 40 feet. All the footage was using TEDs with less than 4 inch bar spacing. There has been no analysis of the shark catch. This work was primarily done to test these TEDs for wild turtle exclusion, and the SEFSC was not working up or identifying the bycatch. However, the SEFC noted that most of these sharks appear to be approximately 2 ½ feet long.”
- The video appears to indicate that a very significant number (~70% ) of the sharks that enter the net are expelled through the new, large TED opening.
- The SEDAR assessment of blacknose shark (and other coastal sharks) relied heavily on SEAMAP data to estimate shark bycatch in shrimp trawl fisheries. The SEAMAP trawl net is not equipped with a TED. Thus, it appears that the assessment did not account for what appears to be a very substantial shark bycatch reduction effect of TEDs used in 100% of the current brown and pink fisheries where blacknose shark bycatch can occur. If this is true, then the assessment is likely to be overly pessimistic.
- The SEDAR assessment also assumed the average weight of sharks caught in shrimp trawl fisheries was 4.97 lb dw. Is it possible to estimate size of sharks that passed through the TED bars into the cod end of the net used in the video to confirm if that is consistent with 4.97 lb dw assumption in assessment?

- Is there any data that can be retrieved from the Georgia Bulldog testing cruises to determine the mortality/survival rates of sharks found in the cod end? Any species identification possible?

A: The Georgia Bulldog footage was provided simply to determine whether *any* sharks still get through the TED bars and are retained in the codend. It has been previously stated that there was an expectation that TEDs would exclude a large proportion of sharks and that NMFS is working with consultants hired by the shrimping industry to explicitly model the TED effect in shrimp fishery bycatch. We do not recommend that the Georgia Bulldog footage be used to show percent escapement or retention as it was a small sample taken in the SA during the off-shrimping season. If a study were to be carried out, it should be done on a shrimping vessel during true operational conditions. The species assemblage, fish behavior and environmental conditions will all be different than during the Georgia Bulldog sample trawls.

Each of the reductions is taken after 1990 to reflect a potential magnitude for the TED effect

Summarized stock status	Base assessment results	% Reduction in bycatch		
		25%	50%	75%
SSF2005/SSFMSY	0.48	0.62	0.65	0.70
F2005/FMSY	3.77	2.67	2.46	2.21
N2005/NMSY	0.48	0.66	0.70	0.74
MSY	89415	77768	73835	69458
B2005/B0	0.17	0.24	0.25	0.27
Pup-survival	0.78	0.77	0.77	0.76
steepness	0.34	0.33	0.33	0.33

75% reduction in bycatch

New catch series Year	bycatch
1950	11509
1951	14783
1952	14964
1953	17204
1954	17772
1955	16105
1956	14640
1957	13157
1958	13073
1959	14664
1960	15706
1961	7878
1962	10328
1963	15560
1964	13915
1965	14953
1966	14114
1967	17335
1968	15807
1969	16546
1970	18233
1971	18674
1972	16797
1973	17085
1974	8716
1975	22969
1976	14957
1977	12863
1978	24171
1979	14823
1980	9759
1981	11475
1982	8964
1983	10731
1984	8201
1985	11025
1986	22764
1987	13656
1988	12270
1989	29999
1990	5651
1991	10495
1992	10750

50% reduction in bycatch

New catch series Year	bycatch
1950	11509
1951	14783
1952	14964
1953	17204
1954	17772
1955	16105
1956	14640
1957	13157
1958	13073
1959	14664
1960	15706
1961	7878
1962	10328
1963	15560
1964	13915
1965	14953
1966	14114
1967	17335
1968	15807
1969	16546
1970	18233
1971	18674
1972	16797
1973	17085
1974	8716
1975	22969
1976	14957
1977	12863
1978	24171
1979	14823
1980	9759
1981	11475
1982	8964
1983	10731
1984	8201
1985	11025
1986	22764
1987	13656
1988	12270
1989	29999
1990	11302.5
1991	20989.5
1992	21499.5

25% reduction in bycatch

New catch series Year	bycatch
1950	11509
1951	14783
1952	14964
1953	17204
1954	17772
1955	16105
1956	14640
1957	13157
1958	13073
1959	14664
1960	15706
1961	7878
1962	10328
1963	15560
1964	13915
1965	14953
1966	14114
1967	17335
1968	15807
1969	16546
1970	18233
1971	18674
1972	16797
1973	17085
1974	8716
1975	22969
1976	14957
1977	12863
1978	24171
1979	14823
1980	9759
1981	11475
1982	8964
1983	10731
1984	8201
1985	11025
1986	22764
1987	13656
1988	12270
1989	29999
1990	16953.75
1991	31484.25
1992	32249.25

75% reduction in bycatch  
(continued)  
New catch series  
Year bycatch

1993	4366
1994	7697
1995	11346
1996	9933
1997	16410
1998	9592
1999	7728
2000	8881
2001	12831
2002	7148
2003	15270
2004	18447
2005	5789

50% reduction in bycatch  
(continued)  
New catch series  
Year bycatch

1993	8732
1994	15394.5
1995	22692
1996	19866
1997	32819.5
1998	19183.5
1999	15456.5
2000	17761.5
2001	25662.5
2002	14296.5
2003	30539.5
2004	36893
2005	11577

25% reduction in bycatch  
(continued)  
New catch series  
Year bycatch

1993	13098
1994	23091.75
1995	34038
1996	29799
1997	49229.25
1998	28775.25
1999	23184.75
2000	26642.25
2001	38493.75
2002	21444.75
2003	45809.25
2004	55339.5
2005	17365.5

**APPENDIX C TABLE OF CONTENTS**

**Appendix C Table of Contents.....C-i**  
C.1 Mid-Atlantic Fishery Management Council’s Request to Secretary Locke to  
Manage Smooth Dogfish.....C-1  
C.2 National Marine Fisheries Service’s Initial Response to the Mid-Atlantic Fishery  
Management Council’s Request.....C-5  
C.3 National Marine Fisheries Service’s Final Determination for Management of  
Smooth Dogfish.....C-7



09-006008

MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

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Secretary Gary Locke  
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NS EXECUTIVE SECRETARIAT  
2009 APR 23 AM 9:14

Dear Mr. Secretary:

At its April 2009 meeting the Mid-Atlantic Fishery Management Council (Council) passed the following motion:

"Move that the Mid-Atlantic Fishery Management Council staff draft a letter to the Secretary of Commerce requesting management authority for smooth dogfish."

Further to the Council's motion, the Council hereby requests management authority for smooth dogfish (*Mustelus canis*) in the Atlantic Exclusive Economic Zone (EEZ). The Atlantic States Marine Fisheries Commission currently manages the smooth dogfish fishery in state jurisdictional waters. As you are aware, at the present time there is no management oversight for this species in federal waters.

The above motion was made in the context of a broader action taken by the Council at its April meeting to authorize the initiation of Amendment 1 to the federal Spiny Dogfish Fishery Management Plan (FMP). The Council believes the inclusion of smooth dogfish in Amendment 1 to the Spiny Dogfish FMP is justified on both practical and legal grounds.

As a practical matter, the participants in the smooth dogfish fishery comprise a subset of active participants in the spiny dogfish fishery. The smooth dogfish fishery occurs primarily in the Mid-Atlantic region, and both fisheries (spiny dogfish and smooth dogfish) use the same gear to commercially harvest these species. The directed smooth dogfish fishery falls within the geographic range of the much larger fishery for spiny dogfish, and the two fisheries are separated temporally as a function of water temperature. From a practical perspective, the smooth dogfish fishery closely overlaps the spiny dogfish fishery and adding smooth dogfish to the Spiny Dogfish FMP would enable the Council to manage the fishery more efficiently than the current HMS proposal to include smooth dogfish with the small coastal shark (SCS) complex in Amendment 3, which is geographically removed from the smooth dogfish fishery, and involves a different set of constituents. The Councils already have standing committees and advisory panels in place for spiny dogfish management.

The Council questions the finding in a recent letter (March 18) from Alan Risenhoover of NMFS' Office of Sustainable Fisheries regarding its preliminary determination that smooth dogfish should be classified as a highly migratory species. Our concern centers on the definition of smooth dogfish as a "highly

migratory species." Section 3 (21) of the Magnuson - Stevens Fishery Conservation and Management Act (Act) defines these species as "tuna species, Marlin (*Tetrapturus spp* and *Maikaira spp.*), oceanic sharks, sailfishes (*Istiophorus spp.*), and swordfish (*Xiphias gladius*)." Smooth dogfish can only meet these criteria if it is determined to be an oceanic shark. The literature does not support this conclusion. The distribution of smooth dogfish is primarily near shore in depths of less than 18 meters with occasional entry into fresh water (Bigelow and Schroeder 1948, Castro 1983, Compagno 1984). Additionally, and unlike highly migratory oceanic shark species such as shortfin mako which may migrate throughout entire ocean basins, the migration patterns of the Mid-Atlantic smooth dogfish population is described in the literature as regionally discrete. Specifically, the literature indicate that the regional population of smooth dogfish along the Mid-Atlantic coast winters between southern North Carolina and Chesapeake Bay, moving northward along the coast to New England and southward to South Carolina as water temperatures warm in the springtime, then withdrawing to their wintering area at the end of the summer (Compagno, 1984). The species is also encountered offshore. However, like spiny dogfish, because of the low value of the product, harvest is typically concentrated in state jurisdictional waters.

The commercial fishery for smooth dogfish along the Atlantic States of the U.S. is highly concentrated within the jurisdiction of the Mid-Atlantic Fishery Management Council. Specifically, 98.3 percent (10,870,677 pounds) of the total coastal landings of smooth dogfish from the Atlantic States were landed in the Mid-Atlantic States (North Carolina through New York - reference Table 1). The balance was landed in New England, principally in Rhode Island and Massachusetts. Like the migratory patterns of the species, the commercial landings are regional in nature. This regional fishery does not raise the typical array of issues associated with highly migratory pelagic shark species, which may have vast migratory ranges that raise international resource-sharing considerations, Transboundary Resource Assessment Committee (TRAC) issues, or related complexities.

Table 1. Pounds of Smooth Dogfish Commercially Landed on the Atlantic Coast

Year	NC	NJ	VA	NY	MD	RI	MA	CT	DE	ME	TOTAL
1997	526,998	212,643		3,014	74,530	2,802	11,245				831,232
1998	489,451	184,220	80,753	21,556	300,240	15,896					1,092,116
1999	504,943	309,100	337,891	4,570	124,749	43,873					1,325,126
2000	335,282	409,592	264,465	23,146	36,458	4,052					1,072,995
2001	510,383	280,883	289,600	116,853	6,864			1,919		270	1,206,772
2002	341,672	248,077		148,996	17,780	3,366			131		760,022
2003	373,056	86,428		164,876	14,193	4,833			273		643,659
2004	623,697	213,565		96,093		3,954	1,281	6,459	475		945,524
2005	647,578	97,978	351,403	80,878	9,286	8,544	15,263				1,210,930
2006	610,248	89,614	254,309	114,165	14,433	4,063	45,156	4,066			1,136,054
2007	641,888	77,658		103,743		14,058		1,961			839,308
TOTAL	5,605,196	2,209,758	1,578,421	877,890	598,533	105,441	72,945	14,405	879	270	11,063,738

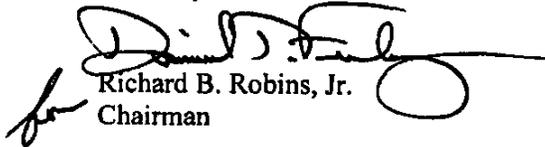
Source: [http://www.st.nmfs.gov/st1/commercial/landings/annual\\_landings.html](http://www.st.nmfs.gov/st1/commercial/landings/annual_landings.html), last accessed 21 April, 2009

We recognize and respect the fact that Section 302 (a)(3) of the Act states that "[t]he Secretary shall have authority over any highly migratory species fishery that is within the geographical area of authority of more than one of the following Councils: New England Council, Mid-Atlantic Council, South Atlantic Council, Gulf Council, and Caribbean Council." While the Mid-Atlantic Council would also agree that smooth dogfish are distributed among several Council areas of authority, over 98 percent of the

Council, Gulf Council, and Caribbean Council." While the Mid-Atlantic Council would also agree that smooth dogfish are distributed among several Council areas of authority, over 98 percent of the commercial landings occur within the Mid-Atlantic States. Furthermore, we would point out that the Spiny Dogfish FMP is a joint plan for coastal sharks that was developed and is carried out cooperatively with the New England Council. The spiny dogfish fishery has been rebuilt in large part due to very restrictive management measures put in place since 2000 when the Councils first assumed jurisdictional authority over this previously unmanaged and overfished stock. The Councils' history of recovering the spiny dogfish stock is evidence of their ability to successfully manage and recover coastal shark species, and we request that you take this successful history into consideration in weighing the determination of management authority.

Because of the strong overlap of the spiny and smooth dogfish fisheries, in terms of geographical distribution, management partners, stakeholders and gear, and the fact that we believe the species does not meet the criteria for being classified as a highly migratory species, the Council has concluded that incorporation of management authority for this species into the current Spiny Dogfish FMP would greatly serve the sustainable management of this species in Federal waters and also provide an effective and efficient mechanism for constituent input into the management process. Your positive consideration and approval of this request will be appreciated.

Sincerely,

  
Richard B. Robins, Jr.  
Chairman

cc: Jane Lubchenco, NOAA Administrator  
James Balsiger, Assistant Administrator for NMFS  
Alan Risenhoover, Chief, Office of Sustainable Fisheries, NMFS  
Patricia Kurkul, NMFS, NE Regional Administrator  
John Pappalardo, Chairman, New England Fishery Management Council

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NMFS commercial landings [http://www.st.nmfs.gov/st1/commercial/landings/annual\\_landings.html](http://www.st.nmfs.gov/st1/commercial/landings/annual_landings.html), last accessed 21 April, 2009





**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL MARINE FISHERIES SERVICE  
1315 East-West Highway  
Silver Spring, Maryland 20910  
THE DIRECTOR

**MAY 14 2009**

Mr. Richard B. Robins, Jr.  
Chairman  
Mid-Atlantic Fishery Management Council  
Room 2115 Federal Building  
300 South New Street  
Dover, Delaware 19904

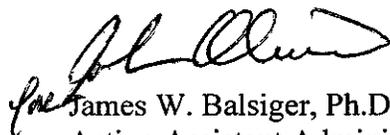
Dear Mr. Robins:

Thank you for your letter to Secretary Gary Locke regarding the Mid-Atlantic Fishery Management Council's request for management authority for smooth dogfish.

NOAA's National Marine Fisheries Service (NMFS) is reviewing your request and will provide a formal determination in the near future. As noted in your letter, the biology of smooth dogfish and the requirements of the Magnuson-Stevens Fishery Conservation and Management Act will need to be carefully assessed to determine proper jurisdiction over the species. NMFS has begun reviewing fishery and life history data of smooth dogfish to inform our determination.

I appreciate your commitment to fishery management.

Sincerely,



James W. Balsiger, Ph.D.  
Acting Assistant Administrator  
for Fisheries







**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL MARINE FISHERIES SERVICE  
Silver Spring, MO 20910

Richard B. Robins, Jr.  
Mid-Atlantic Fishery Management Council  
Room 2115 Federal Building  
300 South New Street  
Dover, Delaware 19904

JUL 08 2009

Dear Mr. Robins:

Thank you for your letter to Secretary Locke regarding the Mid-Atlantic Fishery Management Council's (MAFMC) request for management authority for smooth dogfish.

The National Marine Fisheries Service (NMFS) has carefully considered the MAFMC request and analyzed each of the points presented in your letter. NMFS approached the issue with a firm belief that the stock would be well served either under Secretarial or MAFMC management. With this belief, I directed my staff to perform an analysis of the lawful placement of smooth dogfish management. As detailed in the attached document (Smooth Dogfish Management Authority Analysis), NMFS has determined that smooth dogfish falls within the congressional directive regarding highly migratory species (HMS) and should be managed under the Secretary's authority.

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) is the primary statute giving fishery management authority to NMFS, on behalf of the Secretary, and the Regional Fishery Management Councils. In most cases, Regional Fishery Management Councils have authority for fisheries management for stocks and species within each Council's geographic jurisdiction due to the Council's close cooperation with constituents, fishery experience and knowledge, and consensus building process. The only exception to this management authority is for Atlantic HMS that are more effectively managed as a single unit. For this reason, management of HMS was unified by the Magnuson-Stevens Act under the Secretary of Commerce.

Smooth dogfish are found in each of the five Atlantic Regional Fishery Management Council regions and recreational and commercial catches have been reported in four of these regions. While the fisheries in these regions are not currently as developed as that in the mid-Atlantic, the species is currently caught and fishing effort on smooth dogfish could expand in these other regions. If federal smooth dogfish management measures are implemented, including commercial and recreational permit requirements, through Amendment 3 to the 2006 Consolidated HMS FMP, the full impact of the fishery outside of the mid-Atlantic will likely be clarified. Such a wide distribution and range necessitates singular authority resulting in NMFS' determination that smooth dogfish, an oceanic shark, should be managed by the Secretary.

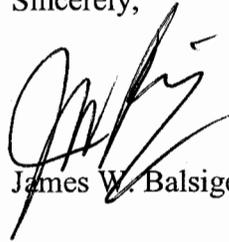
As you noted in your letter, the current commercial fishery is highly concentrated within the mid-Atlantic region and overlaps with the spiny dogfish fishery. As such, I have asked the HMS staff to work closely with the MAFMC to develop specific management measures to ensure



complementary management between smooth dogfish and other fisheries under your authority. I encourage you to submit specific draft management measures and plans relative to the mid-Atlantic portion of the fishery directly to NMFS where they will be reviewed and implemented to the greatest extent practicable in an appropriate rulemaking.

Your commitment to fishery management is sincerely appreciated, and I look forward to close collaboration on federal smooth dogfish management.

Sincerely,

A handwritten signature in black ink, appearing to read 'J. Balsiger', written over the printed name below.

James W. Balsiger, Ph.D.

cc: Daniel Furlong, Executive Director, MAFMC  
Patricia Kurkul, NMFS, NE Regional Administrator  
Alan Risenhoover, Chief, Office of Sustainable Fisheries, NMFS  
John Pappalardo, Chairman, New England Fishery Management Council

## **Smooth Dogfish Management Authority Analysis**

### **Magnuson-Stevens Fishery Conservation and Management Act**

Two subsections and one National Standard in the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) are particularly relevant for determining legal authority and are as follows:

- Section 302 (3):

The Secretary shall have authority over any highly migratory species fishery that is within the geographical area of authority of more than one of the following Councils: New England Council, Mid-Atlantic Council, South Atlantic Council, Gulf Council, and Caribbean Council.

- Section 3 (21):

The term "highly migratory species" means tuna species, marlin (*Tetrapturus* spp. and *Makaira* spp.), oceanic sharks, sailfishes (*Istiophorus* spp.), and swordfish (*Xiphias gladius*).

- Section 301(3) (National Standard 3)

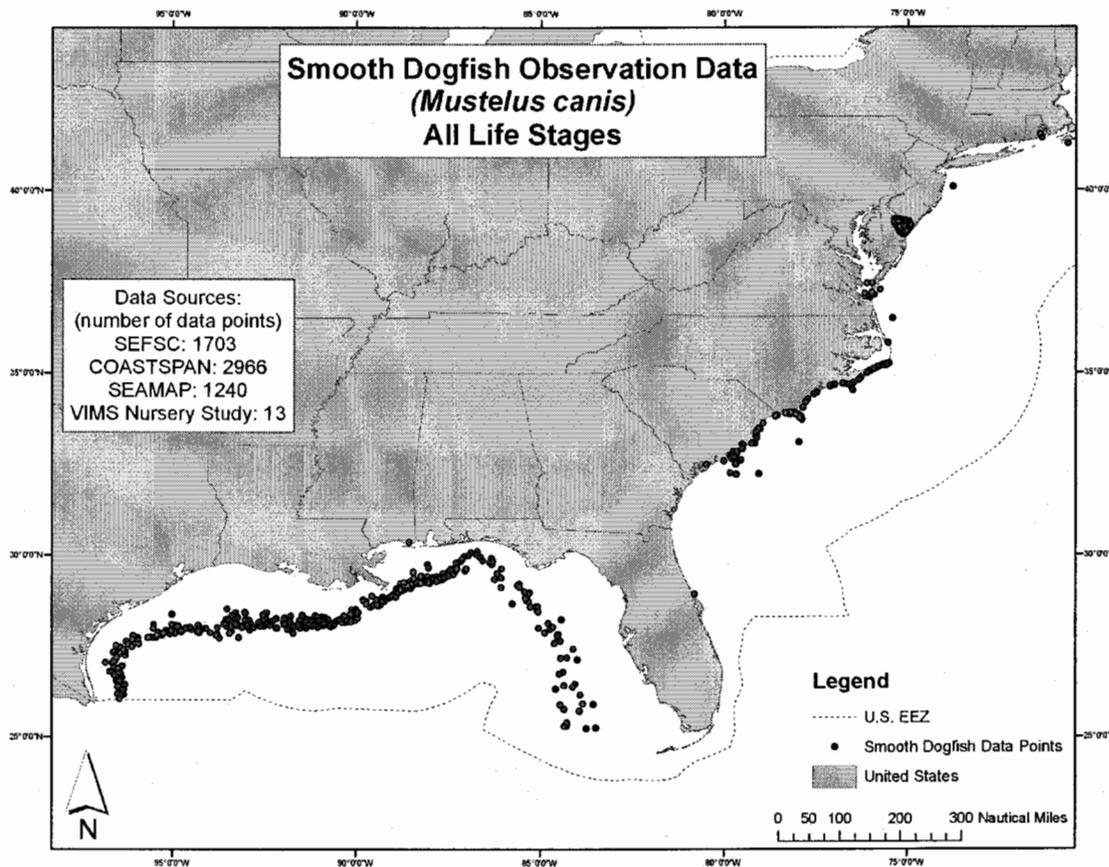
To the extent practicable, an individual stock of fish should be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

Magnuson-Stevens Act Section 3 (21) defines highly migratory species (HMS). Unlike other HMS, sharks are not defined by family or species. Rather, the term "oceanic shark" is used. The statute does not further expound upon or define this term. Given the broad application of the term in conjunction with the habitat, migratory patterns and geographic distribution of the species, smooth dogfish is fairly characterized as an oceanic shark.

NMFS examined Section 302 (3) and Section 301 (3) (National Standard 3). Both of these sections relate to management authority based on the distribution of the species. The Compagno (1984) reference included in the MAFMC letter states that smooth dogfish inhabit the geographical area of all five Atlantic Regional Fishery Management Councils, and across international boundaries to South America and Mexico.

Based upon the distribution, occurrence, and seasonal patterns of the smooth dogfish, NMFS has concluded that the smooth dogfish is properly considered highly migratory. According to Compagno (1984), smooth dogfish tend to be found inshore during the warmer months. However, thermally stable, deep offshore waters are preferred in the colder months (up to 200m) and Caribbean populations occupy waters deeper than 200m. Based on distribution maps provided in Compagno (1984), smooth dogfish are found along the eastern seaboard, in the Gulf of Mexico, and in the Caribbean Sea. Their distribution further extends to the northern South American coast.

Smooth dogfish observation data from research cruises supports this conclusion. The following map summarizes nearly 6,000 NMFS and university observations of smooth dogfish from the Cooperative Atlantic States Shark Pupping and Nursery (COASTSPAN) and the Southeast Area Monitoring and Assessment Program (SEAMAP) surveys, as well as data from Southeast Fisheries Science Center (SEFSC) and a Virginia Institute for Marine Sciences (VIMS) shark nursery area study (Figure 1).



**Figure 1** Smooth dogfish observation data across all life stages

Emerging research indicates that there have been taxonomic classification errors relating to smooth dogfish. The Florida smoothhound (*Mustelus norrisi*), found in the Gulf of Mexico, has been found to be the same species as smooth dogfish as determined by genetic analysis (Driggers, pers. comm.). This misclassification has likely led to under-representation of smooth dogfish in data from the Gulf of Mexico. Once this taxonomic misclassification is addressed, NMFS expects that our understanding of the proportion of the smooth dogfish stock within the Gulf of Mexico to increase relative to the mid-Atlantic. Amendment 3 to the 2006 Consolidated HMS FMP will address this misclassification within the smooth dogfish management measures.

In order to comply with Section 302 (3) and National Standard 3, smooth dogfish, an oceanic shark, should be managed as an HMS across its entire distribution which spans multiple Councils. Due to this wide distribution, smooth dogfish is appropriately managed by the Secretary under its statutory HMS authority.

**Smooth dogfish overlap with the spiny dogfish fishery**

The April 22 2009, MAFMC request noted a high degree of overlap between the smooth and spiny dogfish fisheries including participants, gear types and geographic range. NMFS has concluded that while there is overlap, smooth dogfish fishermen are not simply a subset of spiny dogfish fishermen. Based on vessel trip report (VTR) data between 2004 and 2007, NMFS found that:

- a) Of vessels that reported landing spiny dogfish, approximately 20 percent also landed smooth dogfish in the same year; spiny dogfish fishermen land about 44 percent of the total smooth dogfish landings.
- b) Of vessels that reported landing smooth dogfish, approximately 35 percent also landed spiny dogfish in the same year; smooth dogfish fishermen land about 2.4 percent of the total spiny dogfish landings
- c) Vessels that retain both smooth and spiny dogfish in the same year do not necessarily land both species consistently year after year. Of the vessels that catch both species within a year, approximately 35-45 percent are the same year to year.
- d) Both fisheries utilize trawl and gillnet gear for the majority of the landings.

NMFS also found that there is some geographic overlap between the spiny and smooth dogfish commercial landings. However, the spiny dogfish fishery is primarily concentrated in the north (64 percent of the landings occur in New Hampshire, Massachusetts, and Rhode Island), and the smooth dogfish fishery is primarily concentrated in the south (72 percent of the landings occur in Virginia and North Carolina). There is also some temporal distinction between the fisheries with smooth dogfish landings peaking in May, and spiny dogfish landings peaking in July, staying consistent through December, and tapering off through January and February.

### **References**

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**APPENDIX D TABLE OF CONTENTS**

**Appendix D Table of Contents ..... D-i**

**D.0 Appendix: Proposed Rule and Draft Environmental Impact Statement**

**Comments and Responses ..... D-1**

D.1 SCS Commercial Quotas ..... D-1

D.2 Commercial Gear Restrictions ..... D-14

D.3 Commercial Pelagic Shark Effort Controls ..... D-18

D.4 Recreational Measures for SCS ..... D-22

D.5 Recreational Measures for Pelagic Sharks..... D-24

D.6 Smooth Dogfish ..... D-28

D.7 General Comments..... D-45

D.8 Economic Comments ..... D-51



## **D.0 APPENDIX: PROPOSED RULE AND DRAFT ENVIRONMENTAL IMPACT STATEMENT COMMENTS AND RESPONSES**

### **D.1 SCS Commercial Quotas**

#### *Science/Stock Assessment*

Comment 1: National Marine Fisheries Service (NMFS) received comments regarding the average weights used for blacknose sharks. Commenters noted that the blacknose shark stock must be healthy, since blacknose sharks of various sizes are being landed across all fisheries. In addition, the Gulf of Mexico Fishery Management Council (GMFMC) commented that the average size of blacknose shark landed in the recreational fishery weighed only 1.5 lb dressed weight (dw), which corresponds to a fish less than two feet long, and therefore it appears that this data is incorrect. The recreational catches included only landed sharks. However, released blacknose sharks make up a substantial proportion of the total recreational catches, in some years exceeding landings. In other stock assessments, a release mortality percentage is applied to the releases reported in Marine Recreational Fishing Statistics Survey (MRFSS) to account for recreational dead discards. Leaving recreational dead discards out may result in erroneous assessment results.

Response: NMFS recognizes that blacknose sharks of various sizes are caught in the SCS fishery, and that the average weight for recreationally caught blacknose sharks, which is the best available data from MRFSS, may be underestimated. However, only recreational landings and discard data were used in the stock assessments; average weights in the recreational fishery were not used in the 2007 SCS and blacknose shark assessments. In order to estimate recreational landings and dead discards for the stock assessment, NMFS used data from three recreational surveys (MRFSS, the NMFS Headboat Survey, and the Texas Parks and Wildlife Department Recreational Fishing Survey). NMFS also used MRFSS to estimate blacknose shark average weights, and NMFS realizes that an average weight for recreationally-caught blacknose sharks of less than 2 lb dw reflects a small juvenile shark, but this average weight of blacknose sharks is the best available data from MRFSS. Recent data from the Southeast Fisheries Science Center (SEFSC) has shown that the average size of blacknose sharks caught in gillnets is 18.7 lb dw, as opposed to the 14.4 lb dw that was used in the DEIS analysis. Based on this updated average weight, NMFS has modified the average weight of blacknose sharks across all commercial gears types to 6.4 lbs, as opposed to 5.4 lbs used in the DEIS. Consistent with 40 C.F.R. §1503.4(2)-(3), NMFS responded to this comment in the DEIS improved its analysis of blacknose mortality rates and developed, identified and evaluated a new A6, which would set the SCS quota at 221.6 mt dw and the blacknose quota at 19.9 mt dw. The preferred alternative in the DEIS was A-4.

Comment 2: Several commenters had questions on where the research for the stock assessments occur, who does the assessments and research, what data goes into the

assessments and whether the assessment considered the Atlantic Large Whale Take Reduction Plan regulations.

Response: The 2007 Southeast Data, Assessment, and Review (SEDAR) SCS stock assessment was organized around three workshops. All workshops are open to the public to ensure the assessment process is transparent. The first is a Data Workshop, during which fisheries monitoring, life history data, catch data and indices of abundance from both fishery independent and fishery dependent sources are reviewed and compiled. The report of the Data Workshop provides all sources of data and research that was conducted and included in the stock assessment. The data reviewed at this workshop includes fishery dependent data (e.g., fishermen, dealer and observer reports), fishery independent data (e.g., scientific surveys), and scientific data regarding the biology of the species. In all, participants of the Data Workshop reviewed over 20 individual catch indices along with other data regarding catches and biological information. Current and historical regulations such as the Atlantic Large Whale Take Reduction Plan regulations and the Atlantic HMS regulations are summarized for consideration by the participants in the stock assessment. The scientists realize that management can affect fisheries monitoring, and data collection and work to account for these impacts when finalizing the data to be used in the assessment models. The explanation of the process for conducting the stock assessment is provided in Chapter 3 of the FEIS.

Comment 3: Fishermen are not fishing for sharks, including blacknose sharks, anymore since it is not profitable. NMFS could be misinterpreting this decline in effort as population declines. Shark catches are just incidental catches and occur only in the Tortugas.

Response: NMFS recognizes that effort has decreased in the shark fisheries in terms of the number of boats and in the number of sets, and that there are several fishermen in the Atlantic, GOM and Caribbean still fish for sharks in a directed and incidental manner. In order to account for this decreased effort, NMFS uses a weighted average of effort and landings when conducting data analysis. This provides a better understanding of the catch-per-unit effort of the active vessels in the fishery. Furthermore, the SEDAR stock assessment process uses fishery-independent data in the analysis. This type of data is generally immune to, and helps correct for, changes in fishing effort.

Comment 4: NMFS received several comments stating that the SEDAR 13 2007 SCS stock assessment is not the "best available science." Commenters noted concerns over certain data issues, the use of trawl data before and after TEDs were required, modeling assumptions, and management choices described in the stock assessment. One commenter stated that while he has advocated for closing the shark gillnet fishery, he is concerned that NMFS is using suspect data to justify what would otherwise be a good outcome. Other commenters noted that shark stock assessments for various species tend to move the species assessed from overfished to healthy and then from healthy to overfished frequently. Many commenters felt that NMFS should wait for the new stock

assessment and should not implement new quotas or other regulatory changes for blacknose sharks based on the 2007 assessment.

Response: NMFS used the best available science and a rigorous SEDAR stock assessment process to make the determination that blacknose sharks are overfished with overfishing occurring. The independent review panel determined that the data used in the SCS stock assessment were considered the best available at the time. They also determined that appropriate standard assessment methods based on general production models and on age-structured modeling were used to derive management benchmarks given the data available. Therefore, NMFS believes that the 2007 SCS stock assessment represents the best available science and is not considering delaying implementation of management measures until the next stock assessment is completed. Under the NS1 Guidelines, if a stock is overfished, NMFS is required to “take remedial action by preparing an FMP, FMP amendment, or proposed regulation...to rebuild the stock or stock complex to the MSY level within an appropriate time frame” (50 CFR 600.310(e)(3)(ii)). Additionally, “in cases where a stock or stock complex is overfished, [the] action must specify a time period for rebuilding the stock or stock complex that satisfies the requirements of section 304(e)(4)(A) of the Magnuson-Stevens Act.” Therefore, consistent with the results of the 2007 SCS stock assessment results, the 2006 Consolidated HMS FMP, and the Magnuson-Stevens Act, NMFS is implementing final management measures to rebuild blacknose sharks, while providing an opportunity for the sustainable harvest of the other sharks in the SCS complex. The discussion of the SEDAR stock assessment process is included in Chapter 3 of the FEIS. NMFS believes that the assessment remains the best scientific data available at this time and the agency is required by National Standard 2 to utilize this information.

Comment 5: The stock assessment should not have combined the two blacknose shark stocks found in the Gulf of Mexico region and the Atlantic coast region. The problem arises with the differences caused by a lack of migration movement between regions and the annual breeding cycle of the Gulf of Mexico stock coupled with the biennial breeding cycle of the Atlantic stock of mature female blacknose sharks. NMFS scientists should model them as two separate stocks and not one. Additionally, because of differences in life history parameters, blacknose sharks in the western North Atlantic should be managed separately from those in the Gulf of Mexico.

Response: In the 2007 SCS stock assessment, the assessment scientists considered the issue and determined that blacknose sharks should be assessed as one stock. The scientists noted that there was conflicting genetic data regarding the existence of two separate stocks, and the potential differences in the reproductive cycle for South Atlantic and Gulf of Mexico populations. As a result, the assessment used an average reproductive cycle of 1.5 -years (the average between reproductive cycles of one year in the Gulf of Mexico and two years in the South Atlantic region). Also, reproductive scenarios were conducted during the stock assessment to determine the effect of different reproductive cycles on the stock status. Under both reproductive scenarios, the overall stock status of blacknose sharks did not change. Thus, the reviewers and assessment scientists agreed that the base case scenario of a 1.5-year reproductive cycle was

appropriate for the assessment. Because it was determined that blacknose sharks are one stock, NMFS plans on implementing regulations to rebuild the blacknose shark stock for the South Atlantic and Gulf of Mexico together. The discussion of the SEDAR stock assessment process is included in Chapter 3 of the FEIS and adequately addressed this issue. NMFS believes that the assessment remains the best scientific data available at this time and the agency is required by National Standard 2 to utilize this information. The existing analysis is adequate changes were therefore not made in the FEIS in response to this comment.

Comment 6: Commenters had questions on why the SCS stock assessment only included data up to 2005 and on the catch rate data from the trawl survey over the last 30 years.

Response: The data used in the 2007 SCS stock assessment includes data up to 2005, which was the most current year of data available at the time the SEDAR Data Workshop was held in February of 2007. Full descriptions of the data used in the 2007 blacknose stock assessment to estimate blacknose bycatch in the GOM are in SEDAR13-DW-31 and SEDAR13-DW-32. Both papers are available on the SEDAR website at [http://www.sefsc.noaa.gov/sedar/Sedar\\_Documents.jsp?WorkshopNum=13&FolderType=Data](http://www.sefsc.noaa.gov/sedar/Sedar_Documents.jsp?WorkshopNum=13&FolderType=Data). As outlined in the Final SEDAR 13 SCS Report, the blacknose shark bycatch in the South Atlantic was calculated as a proportion of the Gulf of Mexico bycatch. As for the data from the Southeast Area Monitoring and Assessment Program (SEAMAP), six “time series” were used to estimate blacknose shark bycatch in the shrimp trawl fisheries. These were the fall time series Fall Groundfish (FG) 1972-1986, First Fall (FF) 1987, Fall SEAMAP (FS) 1988-2006; and the summer time series Summer SEAMAP (SS) 1987-2006, Early SEAMAP (ES) 1982-1986, and Texas Closure (TC) 1981. The SEAMAP surveys did not utilize TEDs. However, shrimp trawl observer data from 1972-2005 also were used to estimate blacknose bycatch in the shrimp trawl fisheries and shrimp trawl effort data for the Gulf of Mexico and the South Atlantic from 1972 – 2005 were also used in the SEDAR 13 assessment. The discussion of the SEDAR stock assessment process is included in Chapter 3 of the FEIS. It discloses the data sources that existed at the time of the stock assessment. NMFS believes that the assessment and the data upon which it relied remains the best scientific data available at this time. The agency is required by National Standard 2 to utilize this information. The existing data and analysis are adequate and changes were therefore not made in the FEIS in response to this comment.

Comment 7: Will the next blacknose shark assessment be a benchmark or update? The protocol of the shrimp observer program seems to be reporting just shark groups, not species specific reporting. NMFS should follow up on this through the observer program.

Response: Since the 2007 stock assessment, NMFS and industry scientists have been developing different models for analyzing the shrimp trawl data. Because the new models, which currently have not been peer reviewed, would be a change in methodology from the 2007 stock assessment, the next blacknose shark assessment will be a benchmark assessment. The Data Workshop for this assessment, which will also assess

sandbar and dusky sharks will take place in summer 2010. NMFS is currently working with the shrimp observer program to increase species specific shark data reporting.

Comment 8: NMFS received comments regarding the survival of blacknose sharks and that stated that blacknose sharks are alive at the boat and will survive if released. NMFS also received comments that disputed the reduction of blacknose catches.

Response: A review of the data from the 2005-2008 Shark Gillnet Observer Database, which reported the number of sharks caught in the gillnet fishery during observed trips, detailed the disposition of the sharks caught in gillnets. From this data, the number of sharks that were landed and kept, landed alive and released, and landed dead and discarded was determined. Based on this data, NMFS has changed the mortality rate for discards to 80 percent instead of 100 percent that was used in the DEIS. Although catch rates may remain unchanged, a stock may show signs of stress through changes in average size towards smaller individuals, or to increasingly larger numbers of younger individuals in the stock. While there has not been a reduction in blacknose shark commercial landings, based on the most current stock assessment, the blacknose shark stock has been determined to be overfished, with overfishing occurring. For this reason, NMFS has decided to implement management measures to rebuild this overfished stock and to stop overfishing. Based on this comment NMFS made changes in mortality rates in its analysis in the FEIS.

#### *Shrimp Trawls and Working with the Regional Fishery Management Councils*

Comment 9: NMFS received many comments regarding the blacknose shark mortality related to the Gulf of Mexico shrimp trawl fisheries. The State of Louisiana agrees that the majority of the reported blacknose shark mortality comes as bycatch from the Gulf of Mexico shrimp trawl fishery, but notes that the effort in this fishery has been reduced from 2005 due to hurricanes Katrina and Rita and fuel prices. The GMFMC and others also commented that the Gulf of Mexico shrimp trawl bycatch portion of blacknose shark mortality (45 percent) seems high. Specifically, these commenters note that shrimp fishing effort in 2005 in areas where red snapper are abundant was reduced by 50 to 60 percent from 2001-2003 periods and was reduced by approximately 65 percent in 2006. It has been further reduced in 2007 and 2008 by approximately 75 percent. The number of vessels participating in the offshore shrimp fishery is expected to continue declining until at least 2012, and has been further reduced by the impacts of hurricanes Katrina and Rita. With time/area closures, the shrimp trawl effort is unlikely to rebuild to its prior historical levels. As a result, basing blacknose shark mortality rates by gear type using the years 1999-2005 may produce anomalous results that are not representative of long term trends. Those estimates should be recalculated using more recent years or a longer time series of years. All of these comments stated that NMFS should update their mortality figures utilizing current offshore Gulf of Mexico shrimp trawl effort data.

Response: NMFS would like to thank the State of Louisiana and the GMFMC for their comments. NMFS is working with the GMFMC, and agrees that blacknose shark

mortalities have dropped significantly due to decreased effort in the shrimp trawl fishery in the Gulf of Mexico. NMFS also recognizes that the impacts from hurricanes, and other events, in recent years may have affected effort or landings data. Effort in the Gulf of Mexico shrimp fishery has decreased 64 percent from the average effort across the entire Gulf of Mexico in 1999-2005 compared to effort in 2008 (James Nance, NMFS SEFSC pers. comm.). Although an analysis of the spatial/temporal distribution of this reduction relative to the distribution of blacknose shark bycatch has not been conducted, a starting assumption could be that this equates to a commensurate 64 percent reduction in bycatch.

Modeling efforts are ongoing that incorporate a TED effect in the bycatch estimation model. Preliminary analyses utilizing the new modeling technique indicate that bycatch may have been reduced by approximately 50 percent in 1999-2005. When bycatch reductions from the effort reduction of 64 percent are combined with an approximately 50- percent bycatch reduction anticipated from the TED effect, a preliminary estimate of the overall reduction is approximately 82 percent from 1999-2005 levels. Full results will be provided once the study is complete. The uncertainty is not fully defined in these preliminary bycatch estimates, and there may be spatio-temporal differences in bycatch trends. More data and further analyses are required to determine any uncertainty in the estimates and to re-evaluate the status of the blacknose shark stock. The next assessment is scheduled for 2010, and NMFS will re-visit shrimp bycatch and shrimp trawl effort at that time. Since the modeling data, analyses and conclusions are preliminary and have not been peer reviewed, they are not available for use in the FEIS. NMFS believes that the 2007 SCS assessment and the data upon which it relied with respect to bycatch in the shrimp trawl fisheries remains the best scientific data available at this time. The agency is required by National Standard 2 to utilize this information. The existing data and analysis are adequate and changes were therefore not made in the FEIS in response to this comment.

Comment 10: NMFS received comments regarding the Georgia Bulldog trawl video and the ability of blacknose sharks to go through TEDs. Several commenters expressed skepticism that blacknose sharks could fit through the four inch bar spacing of a TED. Other commenters asked about the species of shark in the video and whether they went through the TED.

Response: The SEFSC's video footage of TEDs in shrimp trawls shows sharks and protected resources (*i.e.*, sea turtles) being excluded from shrimp trawls using TEDs with less than 4-inch bar spacing. The video footage was taken from a shrimp trawler, the R/V *Georgia Bulldog*, off the coast of Georgia, within 10 miles of shore, in water depths less than 40 feet. The footage shows that some small sharks (blacknose, bonnethead, and Atlantic sharpnose), as well as various other finfish, can pass through the TEDs and into the codend of the trawl; NMFS has not conducted any analysis on the bycatch at this time (*e.g.*, bycatch was not identified to species, length measurements were not taken). The video is not appropriate for detailed analysis of the TED impact on catch and bycatch, but rather serves as a starting point because it shows that sharks do make it through this bycatch reduction device technology. The discussion and analysis of SCS bycatch in the shrimp trawl fisheries used in the 2007 SCS stock assessment remains

the best scientific data available at this time. The agency is required by National Standard 2 to utilize this information. The existing data and analysis are adequate and changes were therefore not made in the FEIS in response to this comment.

Comment 11: NMFS received numerous comments regarding the bycatch of blacknose sharks in shrimp trawl fisheries. Commenters suggested that NMFS should study potential ways to reduce bycatch of blacknose sharks and other species in trawl fisheries, including gear modifications, gear restrictions, or time-area closures and implement measures to reduce this bycatch. In addition, NMFS received comments that NMFS should work together with Regional Fishery Management Councils to reduce the bycatch of blacknose sharks in the shrimp trawl fisheries and to ensure annual catch limits (ACLs) and accountability measures (AMs) are set for fisheries that catch blacknose sharks in order to limit the significant mortality in the shrimp fisheries.

Response: NMFS is working with the Gulf of Mexico and South Atlantic Fishery Management Councils to establish bycatch reduction methods, as appropriate, to reduce blacknose shark mortality in the shrimp trawl fisheries. In addition, NMFS SEFSC has been working with industry scientists to re-evaluate the shrimp bycatch models used in the 2007 SCS stock assessments. In particular, they have been evaluating the effect of TEDs on SCS bycatch in shrimp trawls. NMFS continues to monitor and evaluate bycatch in HMS fisheries through the PLL, BLL, and gillnet observer programs, and evaluation of management measures such as closed areas trip limits, and gear modifications. Because the Gulf of Mexico and South Atlantic Councils manage the shrimp trawl fisheries, NMFS is only implementing measures in this amendment to reduce the landings and discards in Atlantic shark fisheries. Regulatory changes to the shrimp trawl fisheries in the South Atlantic and Gulf of Mexico regions would be done through the Council-process in those regions. This amendment includes a mechanism to specify ACLs for stock complexes and certain specific shark species as well as identify AMs, consistent with the Magnuson-Stevens Act requirements to establish a mechanism for specifying ACLs and AMs at a level that will prevent overfishing. The regulations necessary to adjust ACLs as needed and to apply AMs are currently in place. The DEIS explained NMFS' approach to reducing bycatch by working with the regional fisheries management councils responsible for those fisheries. In addition, NMFS has committed to ongoing monitoring and future evaluation of this issue. That discussion is included in Chapter 1 of the FEIS.

Comment 12: Some commenters noted that the shrimp industry has mandated TEDs and other bycatch reduction devices, and ask if there are other shrimp trawl bycatch reduction measures that can be implemented.

Response: NMFS agrees that the mandating of TEDs and other bycatch reduction devices have aided in the reduction of blacknose shark catches and other protected resources. Currently, NMFS is working with the GMFMC, SAFMC, and the shrimp industry to look at other ways to decrease the shark bycatch in the shrimp fishery. For the reasons stated in response to comment 11, NMFS has not made changes in the FEIS based on this comment.

### Quota Alternatives

Comment 13: NMFS should implement alternative A1, which calls for no action to the SCS commercial quota. This alternative is appropriate given the concerns on the science for blacknose and the range of alternatives. The Atlantic Large Whale Take Reduction Plan (ALWTRP) regulations eliminate gillnet fishing for 5 months a year (November to April), which should be positive for blacknose sharks. When the fishery opens in April and May, the blacknose sharks are within state waters, therefore, NMFS should not change anything and stay with the 5 month ALWTRP closure.

Response: The results of the 2007 SCS stock assessment determined that, despite the ALWTRP, blacknose sharks are overfished and overfishing is occurring. The assessment recommended a blacknose shark specific TAC and a corresponding rebuilding timeframe. One objective of this amendment is to ensure that fishing mortality levels for blacknose sharks are maintained at or below levels that would result in a 70 percent probability of rebuilding in the timeframe recommended by the assessment. Under the NS1 Guidelines, if a stock is overfished, NMFS is required to “take remedial action by preparing an FMP, FMP amendment, or proposed regulation...to rebuild the stock or stock complex to the MSY level within an appropriate time frame” (50 CFR 600.310(e)(3)(ii)). NMFS chose not to select the status quo alternative as the preferred alternative because it does not end overfishing or implement a rebuilding plan for overfished stocks as required by the Magnuson-Stevens Act. Based on further analysis of new data and public comment, NMFS changed the preferred SCS quota alternative from the DEIS to the FEIS. NMFS is now preferring alternative A6 which would have a non-blacknose SCS quota of 221.6 mt dw and a blacknose shark quota of 19.9 mt dw because it implements quotas necessary to rebuild and end overfishing of blacknose sharks. The preferred alternative, by allowing the gillnet fishery to continue, also mitigates some of the economic impacts that are necessary and expected and necessary in order to reduce fishing mortality as prescribed by the recent stock assessment. Thus, the preferred SCS quota and commercial gear alternatives strike a balance between positive ecological impacts that must be achieved to rebuild and end overfishing on depleted shark stocks while minimizing the negative economic impacts that would occur as a result of these measures.

While NMFS is obligated by the regulations published by the Council on Environmental Quality to identify its preferred alternative, the FEIS is not a decision document and the Agency retains the discretion to select any reasonable alternative evaluated in the FEIS, including the No Action alternative and alternatives A2, A3, A4 or A5. While NMFS has expressed a preference in the FEIS for alternative A6, the agency has made no final decision in this regard and will not do so until the final Agency review of the FEIS and other relevant documents and signs a Record of Decision selecting final alternatives.

Comment 14: NMFS received a number of comments indicating that gillnet fishermen can adapt their fishing techniques and gear to avoid catching blacknose sharks. Specific comments included: Did NMFS consider that fishermen can adapt and select on certain species?; gillnet fishermen can adapt to avoid catching blacknose sharks similar to

how they reduced turtle and marine mammal bycatch; strikenet gear is a clean gear and can be modified to avoid blacknose sharks; it is possible to design gillnet gear to eliminate blacknose shark catches; and NMFS should set aside Amendment 3 or go with status quo until more gear research can be conducted.

Response: Due to this comment, NMFS reviewed the 2005-2008 Shark Gillnet Observer Data. Based on this analysis, NMFS agrees that fishermen may be able to adapt and specifically target some species while avoiding others. The percentage of blacknose sharks in the catch from gillnet trips that were targeting other species were: 2.6 percent from 5 trips that targeted Blacktip sharks, 1.4 percent from 17 trips that targeted Atlantic Sharpnose sharks, 8.3 percent from 6 trips that targeted Bonnethead sharks, and 3.9 percent from 118 unspecified shark trips. NMFS used this information to re-analyze the SCS quota and commercial gear alternatives. Based on this analysis and public comment, NMFS is changing the preferred alternative to alternative A6, which would have a non-blacknose SCS quota of 221.6 mt dw and a blacknose shark quota of 19.9 mt dw. In addition, NMFS would not prohibit gillnets as an authorized gear type and would change the commercial gear preferred alternative to B1, the No Action alternative. If in subsequent analysis the data shows that shark fishermen have been able to avoid catching blacknose sharks, NMFS will re-evaluate the landings data, and increase the either, or both, the quota for non-blacknose SCS and the blacknose sharks., However, if a re-evaluation of the data shows that fishermen have not been able to minimize blacknose shark mortalities, then NMFS reserves the right to decrease either, or both, quotas. In response to this comment, NMFS made the changes described above to the FEIS including the identification of a preferred alternative to continue the use of gillnet as authorized gear for harvesting all Atlantic sharks.

Comment 15: NMFS received numerous comments on the proposed non-blacknose SCS quota. Several commenters were concerned that the non-blacknose SCS quota was too low particularly since these species stocks are healthy and are a viable alternative for fishermen. The low quota could result in high regulatory discards. The State of North Carolina noted that if NMFS reduced the non-blacknose SCS quota, North Carolina fishermen will be disproportionately impacted by this regulation by removing fair and equitable distribution of SCS quota and implementing measures contrary to measures in state waters. The State of South Carolina noted that the proposed quota of 56.9 mt dw for small coastal sharks will result in a 76 percent reduction in the landings of finetooth, Atlantic sharpnose and bonnethead sharks in the shark fishery. As such, this reduction in the quota for these three species would seem unwarranted at this time. Additionally, this proposed reduction will have significant repercussions among South Carolina's permitted commercial fisherman who landed 10 mt dw of these three species in 2008 or nearly 17 percent of the proposed quota for the Atlantic, Gulf of Mexico and Caribbean fisheries, combined. In addition, the small quota is likely to be reached and the fishery closed before South Carolina fishermen have an opportunity to land their traditional catch. For these reasons, NMFS should implement alternative A2 in combination with the gillnet prohibition, alternative B3.

Response: NMFS recognizes that the status of non-blacknose SCS is not overfished and not experiencing overfishing. In the DEIS, the preferred alternative, A4, would have set the commercial quota for non-blacknose SCS sharks at 56.9 mt dw, and the blacknose shark quota at 14.9 mt dw. Due to recent data updates, analysis, and public comments, NMFS has changed the preferred alternative from A4 to A6, which would set the commercial quota for non-blacknose SCS at 221.6 mt dw and the blacknose shark quota at 19.9 mt dw. The proposed non-blacknose SCS quota would set the commercial quota equal to the average non-blacknose sharks SCS landings from 2004 through 2008 and therefore would not have economic impacts beyond the status quo. By looking at the recent Gillnet Observer Data from 2005-2008 NMFS agrees that it appears that commercial shark fishermen can target non-blacknose sharks and avoid catching blacknose sharks. If in subsequent reviews of the management measures implemented under alternative A6, and commercial shark fishermen are able to minimize their catch of blacknose sharks, NMFS could increase the non-blacknose SCS quota to allow for greater access to these species. Also, any underharvest of the non-blacknose SCS quota from the previous year could be added to the quota the following year, because all of the shark species in this complex (Atlantic sharpnose, finetooth and bonnethead) are not overfished and overfishing is not occurring. NMFS recognizes that there may be a high mortality rate for the blacknose sharks released from the various gears used in the SCS fishery. NMFS is attempting to limit the discard mortalities of blacknose sharks in the SCS fishery associated with the proposed SCS quota, by allowing the commercial shark fishermen to retain the number of sharks equal to the average landings of blacknose sharks from all gears based on the 2004 – 2008 Coastal Fisheries Logbook and Shark Gillnet Observer Data. . In response to this comment, NMFS made the foregoing changes to the FEIS including the identification of a preferred alternative to establish a non-blacknose SCS quota at 221.6 mt dw and allow continued use of gillnet as authorized gear for harvesting SCS.

Comment 16: NMFS received several comments specific to the quota levels for blacknose sharks. Comments suggest that NMFS should prohibit the retention of blacknose sharks by placing the species on the prohibited list. Other commenters suggested that the blacknose shark quota needs to be high enough to allow for the retention of incidental catch. The State of Georgia supports alternative A4 quotas with alternative B3 gillnet closures as it will significantly reduce the impacts of regulatory discards of blacknose sharks, which would occur if the quota for blacknose sharks is reached before the non-blacknose SCS quota.

Response: NMFS agrees that the blacknose shark quota needs to be large enough for fishermen to keep blacknose sharks that are caught incidentally. As detailed in Chapter 4 and Appendix A, NMFS has changed their preferred alternative from A4 to A6. Under alternative A6, the non-blacknose SCS (221.6 mt dw) and blacknose shark (19.9 mt dw) quotas would allow for incidental catch of blacknose sharks. Also, under alternative A6, both the blacknose and the non-blacknose quotas would close when either quota reached, or was projected to reach, 80 percent. This offers an incentive to avoid blacknose sharks and target non-blacknose SCS to ensure that the non-blacknose SCS fishery does not close with quota still available. NMFS considered closing the entire

SCS fishery (alternative A5) however, the stock assessment did not warrant such action. Under the rebuilding plan, a limited number of blacknose sharks can be retained while still meeting rebuilding goals. Furthermore, once a species is placed on the prohibited list, fishery-dependant data on the species will cease to be reported and cannot be used in future stock assessments or management measure determinations. In response to this comment, NMFS made the foregoing changes to the FEIS including the identification of a preferred alternative to establish a blacknose SCS quota at 19.9 mt dw and allow continued use of gillnet as authorized gear for harvesting SCS. The DEIS already included an alternative to close the SCS fishery which would essentially prohibit retention of blacknose. Therefore, an additional alternative to list blacknose as a prohibited species was not added to the FEIS.

Comment 17: NMFS received several comments regarding the overlap of the SCS gillnet fishery with other gillnet fisheries in the southeast region. Comments included: the NMFS proposal will force effort into other fisheries (e.g., kingfish fishery) and this will fracture that other fisheries; NMFS needs to know the number of blacknose shark catches in the mackerel fishery and how that relates to the 22-percent mortality of blacknose shark by gillnets; if NMFS is taking the bulk of effort away, why not let mackerel fishermen keep blacknose sharks; NMFS should eliminate blacknose sharks landings and allow mackerel fishermen to land other SCS; and NMFS should collect data on discards in the mackerel fishery.

Response: NMFS recognizes that fishermen will adapt in different ways to new regulations placed on a fishery, which may include increasing their effort in other fisheries. NMFS plans to continue to collect the best available data from several sources including data on landings, discards, and bycatch. As this new data becomes available, regulation changes could be made that would provide fishermen access to resources that are ecologically and economically viable. Based on the most recent data, which indicates that gillnet fishermen may be able to avoid certain species, NMFS has changed their preferred alternative from B3, which would have eliminated gillnet gear as an authorized gear from South Carolina south, to B1, the No Action alternative, which retains gillnet as an authorized gear in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea. Also, under the new preferred alternative, A6, incidental catches of blacknose sharks will continue to be allowed. In response to this comment, NMFS made changes to the FEIS including the development of a preferred alternative that establishes a blacknose quota at 19.9 mt dw and a non-blacknose SCS quota at 221.6 mt dw. The DEIS already considered an alternative to close the entire SCS fishery which would essentially prohibit retention of blacknose. Therefore, an additional alternative to list blacknose as a prohibited species was not added to the FEIS. The discussion of displacing effort from the shark fishery into other gillnet fisheries was included in the FEIS. NMFS made changes in preferred alternative from the DEIS to the FEIS based on this and similar comments.

Comment 18: NMFS needs to move blacktip sharks back to the SCS quota and increase the quota for all SCS.

Response: NMFS is moving towards species-specific management, including species-specific quota. However, for some species NMFS has only limited data, which requires management to be based on species within a complex of species. The 2007 SCS stock assessment assessed the SCS complex as a whole as well as each species individually, and recommended using species-specific results rather than the aggregated SCS complex results. The assessment recommended a blacknose shark-specific TAC and a corresponding rebuilding timeframe. Therefore, based on these results, NMFS has removed blacknose sharks from the SCS quota and set a separate commercial quota for this species. A species-specific quota enables NMFS to closely monitor blacknose shark landings and fishing effort according to the rebuilding plan. Blacktip sharks are currently managed in the non-sandbar LCS complex implemented in Amendment 2 to the Consolidated HMS FMP. Blacktip sharks are more commonly caught with gear targeting LCS (i.e., BLL gear) rather than gear used to target SCS (i.e., gillnet gear). In addition, the blacktip shark stock assessment recommended that blacktip shark landings should not change or increase from historical catch levels. Placing blacktip sharks within the non-blacknose SCS quota could drastically reduce the blacktip shark regional quota since the non-blacknose SCS shark quota is being reduced in the preferred alternative from 454 mt dw to 221.6 mt dw. Therefore, at this time, NMFS is not placing blacktip sharks within the SCS complex. NMFS has determined that the comment proposes an action that does not meet the purpose and need set forth in the DEIS and FEIS and therefore did not include it as an additional alternative for evaluation in the FEIS.

Comment 19: NMFS stated that they want to help the U.S. fleet catch the entire tuna and swordfish quotas, so why is NMFS against SCS fisherman landing the SCS quota as appears to be the case in preferred alternative A4?

Response: In the DEIS, the preferred alternative A4, would have set the non-blacknose quota at 56.9 mt dw and the blacknose shark species-specific quota at 14.9 mt dw. Recent data, and the analysis of that data, has led NMFS to change the preferred alternative from A4 to A6. If alternative A6, the preferred alternative in the FEIS, is enacted, the non-blacknose SCS quota would be set at 221.6 mt dw, which is the average landings of non-blacknose SCS from 2004 through 2008. The blacknose shark species-specific quota would be set at 19.9 mt dw. These regulations are being considered because the status of the blacknose shark stock has been determined to be overfished, with overfishing occurring. Also, any underharvest of the non-blacknose SCS quota could be added to following years fishing quota, since the stock status of finetooth, Atlantic sharpnose, and bonnethead sharks have all been determined to be healthy. Also, under alternative A6, both the blacknose and the non-blacknose quotas would close when either quota reached, or was projected to reach, 80 percent. This offers an incentive to avoid blacknose sharks and target non-blacknose SCS to ensure that the non-blacknose SCS fishery does not close with quota still available. These measures maximize the opportunity to harvest the healthy non-blacknose SCS while rebuilding and preventing overfishing on the blacknose shark stock. This comment did not target any specific section or issue analyzed in the DEIS and a specific change in the FEIS was not made. As mentioned, however, the preferred alternative for non-blacknose SCS quota has been

adjusted in the preferred alternative between the DEIS and FEIS to address this general concern.

Comment 20: NMFS should save the SCS fishery. NMFS took 4,000 lb LCS trip limit away and are now taking away blacknose sharks. Are there any proposals for buyouts for SCS fishermen?

Response: Currently, there are no proposals to buyout SCS fishermen. Buyouts can occur via one of the three mechanisms, including: through an industry fee, via appropriations from the United States Congress, and/or provided from any State or other public sources or private or non-profit organizations. A buyout plan is not proposed in this amendment because the Agency is unable to implement a buyout as a management option. Buyouts must be initiated via one of the aforementioned mechanisms.

Comment 21: We believe the reductions in the commercial quota and the elimination of the gillnet gear will have significant, positive effects. Based on estimates taken before 2007, your analyses determined that this fishery was responsible for 45 percent of the mortality on blacknose sharks. The Gulf of Mexico shrimp effort was reduced by 74 percent from the average effort of 2001-2003. Because of this action, the historic 46 percent take by the trawl fishery would have already been reduced to about 12 percent of the total take. This reduction should, in combination with reductions from quota and gear alternatives, drive the estimates of total reductions in take by numbers of blacknose shark to something in excess of 80 percent, a value well above the target of 78 percent.

Response: NMFS is working with the GMFMC, and agrees that blacknose shark mortalities in the shrimp trawl fishery have dropped significantly due to decreased effort in the shrimp trawl fishery in the Gulf of Mexico. Based on 2005-2008 Shark Gillnet Observer Data, NMFS believes that gillnet fishermen may be able to effectively target other SCS species while minimizing the mortality of blacknose sharks and protected species. Because of this analysis, NMFS has changed their preferred alternative from B3, which would have eliminated gillnet gear from South Carolina south, to B1, the No Action alternative, which would retain gillnets as an authorized commercial gear type for sharks. Based on this same data, and because of reductions in blacknose shark mortalities in the shrimp trawl fishery, NMFS has also changed the preferred quota alternative from A4 to A6, which would create a non-blacknose SCS quota of 221.6 mt dw and a blacknose shark quota of 19.9 mt dw.

Comment 22: In the Gulf of Mexico, it might be possible to reduce juvenile mortality of blacknose sharks by adopting for shark bottom longlines, on a seasonal basis, the existing reef fish longline boundary (20 fathoms east of Cape San Blas, Florida, 50 fathoms west of Cape San Blas). If this eliminates too much of the traditional shark fishing grounds to be acceptable, than perhaps the “stressed area” boundary, which varies from 10 to 30 fathoms, could be considered.

Response: NMFS considered closing waters inshore of 20 fathoms in the Gulf of Mexico to shark bottom longline gear as a way to reduce fishing pressure on neonate and juvenile blacknose sharks. The majority of the recorded interactions with neonate and juvenile blacknose sharks occur in waters inshore of 20 fathoms. Therefore, by closing waters inshore of 20 fathoms, NMFS would relieve fishing pressure on neonate and juvenile blacknose sharks. However, closing waters inshore of 20 fathoms could have a large, negative socioeconomic impact on the shark BLL fishery in the Gulf of Mexico, as the majority of BLL sharks sets observed from 1994-2007 occurred inshore of 20 fathoms. Given these potentially large, social and economic negative impacts, and the ability to rebuild blacknose sharks through other alternatives, NMFS did not further analyze this alternative in the FEIS. Similarly, NMFS considered closing the waters inshore of 50 fathoms in the Gulf of Mexico to shark BLL fishing, however, because this closure would cover more area and have larger socioeconomic impacts than a 20 fathom line closure, this alternative was not further analyzed in the FEIS.

## **D.2 Commercial Gear Restrictions**

Comment 1: NMFS received numerous comments supporting the proposed alternative to ban gillnets in the shark fishery South Carolina south (alternative B3). The SAFMC and MAFMC both expressed support for the proposal to ban shark gillnet gear. The State of Georgia supports banning gillnet and states that removal of shark gillnet gear is long overdue to reduce incidental take of sea turtles and marine mammals. Other commenters stated that banning gillnet gear would protect blacknose sharks, and reduce bycatch and protected resource interactions.

Response: NMFS would like to thank the SAFMC, MAFMC, and the State of Georgia for submitting comments in support of alternative B3. Based on the 2005-2008 Shark Gillnet Observer Program data, and comments from fishermen; NMFS believes that gillnet fishermen may be able to target other SCS species, and minimize the mortality of blacknose sharks. For this reason, NMFS believes that banning gillnets as an authorized gear type is unwarranted at this time. NMFS would prefer to allow gillnet fishermen the opportunity to prove that they can target specific species, and avoid others. Therefore, NMFS has changed its preferred alternative from B3, which would have banned gillnets from South Carolina south, to B1, the No Action alternative, which would retain all currently authorized gears in the shark fishery. The current regulations for gillnet fishermen, which include two-hour net checks and keeping nets attached to the boat, should continue to help reduce the incidental bycatch of other species. The bycatch and discards of blacknose sharks would be reduced by the implementation of a smaller non-blacknose SCS and blacknose shark quota. The gillnet fishery in the southeast Atlantic Ocean is monitored by vessel monitoring systems (VMS) and has sufficient observer coverage. The VMS and observer coverage has helped protect endangered species like sea turtles and right whales. NMFS believes that allowing gillnet gear as an authorized gear for sharks is consistent with the 2008 Biological Opinion for the Atlantic Shark fishery. The 2008 Biological Opinion was completed for Amendment 2 to the Consolidated HMS FMP which did not prohibit the use of gillnet gear therefore the Biological Opinion was based on the continued use of gillnet gear in the Atlantic Shark fishery and concluded that the Atlantic shark fishery is not likely to jeopardize the

continued existence of endangered green, leatherback, and Kemp's ridley sea turtles; the endangered smalltooth sawfish; or the threatened loggerhead sea turtle. Furthermore, the BiOp concluded that Amendment 2 was not likely to adversely affect any listed species of marine mammals, invertebrates (*i.e.*, listed species of coral) or other listed species of fishes (*i.e.*, Gulf sturgeon and Atlantic salmon) in the action area. NMFS believes that the significant social and economic impacts on the SCS commercial shark participants from prohibiting gillnet gear are disproportionate to the ecological benefits especially since the No Action alternative in combination with alternative A6 reduces blacknose shark mortality to levels consistent with the rebuilding plan for this species.

Comment 2: The gear restriction on the shark gillnets from South Carolina to the Gulf of Mexico and the severe quota reduction of SCS will be detrimental to the critical scientific data that is needed to properly manage this fishery.

Response: NMFS agrees that prohibiting shark gillnet gear would affect the scientific data that is used to manage the SCS fishery. Based on this, and other public comments as well as additional data analysis using updated blacknose shark weight data, NMFS has changed its preferred alternative from B3 in the DEIS, which would have banned gillnets from South Carolina south, to B1 in the FEIS, the No Action alternative, which retains the current authorized gear types. NMFS feels that the scientific data collected from programs like the Shark Gillnet Observer Program provide an invaluable source of fishery dependent information that can augment fisheries independent data collected by NMFS scientists and help to inform fishery management decisions.

Comment 3: Contrary to popular beliefs, gillnet gear is the most selective way of fishing. Gillnet fishermen catch on average a 14.4 lb dw sexually, mature blacknose shark that have spawned at least once. The 2008 BiOp stated that shark gillnet fishermen do not catch as many protected species as bottom longline fishermen. The federal observer data has shown that 97.3 percent of our catch consists of sharks and 98.1 percent of the sharks caught were the targeted species. This gear is not having as big an impact on the stock because they are not catching juveniles. NMFS should consider a gillnet endorsement, not a preferred alternative that would close the fishery. In addition, The State of South Carolina commented that, although the retention of sharks taken by gillnets is already prohibited in their state waters, NMFS should be aware that South Carolina has licensed and permitted commercial fisherman who have historically fished for sharks with gillnets in Federal waters. These fishermen will certainly be impacted and possibly displaced from this fishery through adoption of this proposed action.

Response: In response to this and similar comments NMFS made the following changes between the DEIS and FEIS. The DEIS NMFS preferred alternative, B3, which would have prohibited gillnets from South Carolina south, but due to recent data and new data analysis and public input, NMFS has changed its preferred alternative in the FEIS to B1, the No Action alternative, which would retain gillnets as an authorized gear in the shark fishery. Based on recent data from the SEFSC, NMFS changed the average weight for blacknose sharks caught in gillnets from 14.4 lbs to 18.7 lbs in the FEIS. Also, NMFS re-analyzed the data from the 2005-2008 gillnet observer data. Those analyses showed

that gillnet fishermen may be able to target other SCS species, and minimize the mortality of blacknose sharks. NMFS used this information to re-analyze the SCS quota alternatives in the FEIS. This resulted in NMFS changing the preferred alternative from B3 in the DEIS, which would have eliminated gillnet as an authorized gear in the shark fishery from South Carolina south, to B1 in the FEIS, the No Action alternative, which will retain all currently authorized gears for SCS, including gillnets. In addition, NMFS is still working with the GMFMC to determine the impacts that TEDs have on excluding blacknose sharks from the shrimp trawl nets. NMFS believes that the new preferred alternatives would not displace the South Carolina gillnet fishermen in Federal waters.

Comment 4: There are large areas and times when gillnet fishermen are not allowed to fish. There is already a large gillnet closure area due to state water closures and the ALWTRP regulations. NMFS should work with the few shark gillnet fishermen left to address issues in the few areas where gillnets are being used now. There are not many shark gillnet fishermen left in the industry, and everyone is a seasoned fishermen with over 20 years of experience.

Response: NMFS agrees that gillnet gear is prohibited in many places, such as the state waters of Florida and Georgia and Southeast Right Whale Calving Area. Also, NMFS agrees that there are not many gillnet fishermen who target sharks. There are still gillnet fishermen that catch sharks while targeting other species and some of those fishermen could target sharks. NMFS has gathered all of the comments from gillnet fishermen and re-evaluated the data on the average size of blacknose sharks caught in the gillnet fishery in the FEIS. Based on this analysis, NMFS changed the average weight for blacknose sharks caught in gillnets from 14.4 lbs in the DEIS to 18.7 lbs in the FEIS. Also, the data from the 2005-2008 Shark Gillnet Observer Program seems to indicate that gillnet fishermen may be able to target other SCS species, and minimize the mortality of blacknose sharks. NMFS used this information to re-analyze the alternatives regarding quotas in the FEIS. The new preferred alternative in the FEIS, A6, would set a non-blacknose SCS quota of 221.6 mt dw and a blacknose shark quota of 19.9 mt dw. In addition, NMFS has changed their preferred alternative from B3 in the DEIS, which would have prohibited gillnets from South Carolina south, to alternative B1, the No Action alternative in the FEIS, which would retain gillnets as an authorized gear in the shark fishery.

Comment 5: If a prohibition on gillnet gear is implemented, what is going to stop NMFS from removing all gillnet gear in other fisheries, such as the mackerel fishery, in the future?

Response: In the DEIS NMFS preferred alternative, B3, which would have prohibited gillnets from South Carolina south, but due to recent data and new data analysis and public input, NMFS has changed its preferred alternative to B1, the No Action alternative, which would retain gillnets as an authorized gear in the shark fishery. In addition, this amendment only deals with management measures in the Atlantic shark fishery and any measures specific to the mackerel fishery would be implemented through the Regional Fishery Management Council that has authority for this species. This

comment does not call for change to any specific section of the DEIS. Therefore, no specific change was made in the FEIS in response to this comment.

Comment 6: NMFS received several comments on the use of VMS in the gillnet fishery. One commenter asked if gillnet fishermen would be compensated for VMS if gillnet gear is banned. Another commenter noted that gillnet boats should not have to carry VMS since it is an invasion of privacy and a waste of money to the fisherman and NMFS. Additionally, gillnet fishermen already have sufficient observer coverage. Another commenter noted that NMFS must place significant weight on protecting critically endangered right whales from entanglement and should therefore maintain the VMS requirement for all shark gillnet vessels.

Response: As described in above, NMFS has identified B1, the No Action Alternative as the preferred alternative, which would retain gillnets as an authorized gear type for the Atlantic shark fisheries. The requirements for VMS restrictions would continue under the current regulations. VMS is also vital to fisheries management, enforcement, and safety. VMS is an important tool used to monitor fishing activities in time/area closures and during the North Atlantic right whale calving season to protect this endangered species. NMFS has several other VMS requirements in place for HMS vessels including, BLL vessels in the vicinity of the mid-Atlantic shark closed area, and all vessels with PLL gear on board year-round. Removing VMS requirements is beyond the scope of the proposed action and does not the stated purpose and need. NMFS, therefore, did not include a change in VMS requirements from current regulations in the FEIS.

Comment 7: The State of South Carolina agrees with the proposed boundary for the prohibition for shark gillnet gear. In 2008, commercial fisherman in our state landed 20,000 lbs ww of smooth dogfish primarily from bottom long lines while 7,384 lbs ww of blacknose sharks were landed, with only 372 lbs ww of these reported from gillnets. In our state most catches of smooth dogfish occur in the winter when interactions with whales should be less likely.

Response: NMFS would like to thank the State of South Carolina for submitting information on the commercial fishing landings in their state waters. After reviewing the data from the 2005-2008 Shark Gillnet Observer Program which seems to indicate that gillnet fishermen may be able to target certain and avoid others; NMFS has decided to change the preferred alternative from B3, which would have banned gillnets from South Carolina south, to the No Action alternative, B1, which would continue to allow all of the current authorized commercial fishing gears for sharks, including gillnets. Smooth dogfish would be allowed to be landed with all current authorized gear types. The FEIS carries forward as a reasonable alternative available for selection by the decision maker, the ban on gillnet as an authorized gear in alternative B3.

Comment 8: NMFS received several comments regarding the overlap of the SCS gillnet fishery with other gillnet fisheries in the southeast region. Comments included: the NMFS proposal will force effort into other gillnet fisheries (e.g., kingfish fishery);

NMFS needs to know the number of blacknose shark catches in the mackerel fishery and how that relates to the 22 percent mortality of blacknose shark by gillnets; if NMFS is taking the bulk of gillnet effort away, why not let mackerel fishermen keep blacknose sharks; NMFS should eliminate blacknose shark landings, and allow mackerel fishermen to land other SCS; and, NMFS should collect data on discards in the mackerel fishery.

Response: NMFS recognizes that fishermen may adapt in different ways to new regulations placed on a fishery, which may include increasing their effort in other fisheries. NMFS continues to collect fishery-dependent and fishery-independent data from all federally managed fisheries including data on landings, discards, and by-catch. While the measures implemented in this amendment only pertain to the Atlantic shark fisheries, NMFS considers cumulative impacts on other fisheries and fishery participants when choosing preferred alternatives. Based on the most recent data, which indicates that gillnet fishermen may be able to target certain species with gillnet and avoid others, NMFS has changed the preferred alternative from B3, which would have eliminated gillnet gear as an authorized gear, to alternative B1 the No Action alternative which retains gillnet gear as an authorized gear in the Atlantic shark fishery. Also, under the new preferred alternative, A6, incidental catches of blacknose sharks will continue to be allowed. NMFS made changes in preferred alternative from the DEIS to the FEIS based on this and similar comments.

### **D.3 Commercial Pelagic Shark Effort Controls**

Comment 1: NMFS should prefer the No Action alternative C1. Shortfin mako sharks are underutilized and NMFS should not propose any measures.

Response: Based upon the 2008 ICCAT stock assessment for shortfin mako sharks, NMFS has determined that the North Atlantic population is experiencing overfishing. Under the Magnuson-Stevens Act, if NMFS determines that a fishery is overfished or approaching an overfished condition due to excessive international fishing pressure and there are no management measures to end such overfishing in an international agreement to which the United States is a party, it must take action at the international level to end overfishing (16 U.S.C. §§1854, 1854 note). The ICCAT stock assessment did not provide a recommended TAC or mortality reductions to prevent overfishing of shortfin mako sharks, making it difficult to set a quota or other limit to prevent overfishing. Because there are currently no ICCAT measures to end overfishing of shortfin mako sharks and U.S. shortfin mako shark landings have comprised approximately nine percent of international landings from 1997 through 2008, domestic reductions of shortfin mako shark mortality alone would not end overfishing of the entire North Atlantic stock. Therefore, NMFS believes that ending overfishing and preventing an overfished status would be better accomplished through international efforts.

Comment 2: NMFS received many comments regarding the minimum size alternatives for shortfin mako sharks (alternative C4). These comments included: in order to reduce the risk of overfishing of the shortfin mako, the EPA recommends including a measurable alternative, such as alternative C4a, along with preferred alternatives C5 and C6; there should be a minimum size limit restriction of 73 inch fork

length (FL) (185.4 cm FL) for the commercial harvest of shortfin mako with a retention limit of 3 fish per trip; the size limits for shortfin mako shark should be changed to 108 inches FL (274.3 cm FL) in the commercial fishery; there should be a 72 inch FL (182.9 cm FL) min size for recreational and commercial fisheries; since it is indicated that the commercial fishery lands so few shortfin mako sharks below the recreational minimum size, implementing that minimum size should have minor economic impact on commercial fishermen, yet would have a positive ecological impact on the shortfin mako stock; and NMFS should not establish a commercial minimum size for shortfin mako sharks as that management measure would present safety at sea issues.

Response: NMFS analyzed applying commercial size limits in the shortfin mako fishery according to the size at which 50 percent of males reach sexual maturity (22 in IDL; equivalent to 73 in FL) and the size at which 50 percent of females reach sexual maturity (32 IDL; equivalent to 108 in FL). Using data from pelagic longline (PLL) fishery observers and PLL logbook data, NMFS estimated the average number of additional shortfin mako sharks that would be released alive according to the proposed 22 in IDL and 32 in IDL size limits to be 89 and 5 shortfin mako sharks, respectively. Despite the potentially minimal economic impacts of imposing a commercial size limit for shortfin mako sharks, NMFS concluded that neither of the size limits would dramatically reduce shortfin mako shark mortality in the U.S. commercial fishery and that any mortality reductions would not be enough to end overfishing of this species. NMFS has decided to take action at the international level through international fishery management organizations to establish management measures to end overfishing of shortfin mako sharks. Based on the results of future ICCAT stock assessments of shortfin mako sharks, NMFS may revisit additional management measures for shortfin mako sharks as necessary.

Comment 3: NMFS received numerous comments in support of, and opposition to, the preferred alternative to work at the international level to end overfishing of shortfin mako (alternative C5).

Response: The United States commercial harvest of Atlantic shortfin mako sharks has historically been incidental in the PLL fishery. NMFS determined that the U.S. contribution to North Atlantic shortfin mako shark fishing mortality is relatively low in comparison to the total fishing mortality on the North Atlantic stock. According to ICCAT shortfin mako landings estimates, the United States contributed less than 9 percent ( $3262 \text{ mt ww} / 36,397 \text{ mt ww} = 8.6 \text{ percent}$ ) of the total North Atlantic shortfin mako shark fishing landings. Therefore, domestic reductions of shortfin mako shark mortality alone would not end overfishing of the entire North Atlantic stock, and NMFS has decided to take action at the international level through international fishery management organizations where countries that have large catches of shortfin mako sharks could participate in the establishment of management measures to end overfishing of shortfin mako sharks.

Comment 4: NMFS should take action domestically, such as removing shortfin mako sharks from the pelagic shark species complex and placing it on the prohibited shark species list (alternative C3).

Response: The U.S. commercial PLL fishery does not specifically target shortfin mako sharks and their harvest represents a small percentage of the overall fishing mortality for the North Atlantic shortfin mako shark stock. Moving shortfin mako sharks to the prohibited shark species list would increase the number of dead discards from the U.S. PLL fleet, as retention of shortfin mako sharks that come to the vessel dead would be prohibited. Additionally, reducing U.S. shortfin mako shark mortality alone would likely not be enough to end overfishing for this stock. For these reasons NMFS prefers the alternatives to work internationally to end overfishing of shortfin mako sharks, and to promote the live release of shortfin mako sharks domestically.

Comment 5: NMFS received comments stating that commenters are troubled by NMFS apparent belief that it need not implement strong measures to end domestic overfishing of shortfin mako because the bulk of catch occurs at the international level. Section 304 of the Magnuson-Stevens Act does not prevent NMFS from taking immediate action at the domestic level to prevent overfishing by U.S. vessels. Moreover, the Magnuson-Stevens Act section 303 specifies that all fishery management plans, including those applicable to species that are managed under international agreements, have effective ACLs and AMs by 2010 or 2011 unless the agreement specifies a different deadline. Nothing in the Magnuson-Stevens Act requires NMFS to avoid taking action on the domestic front simply because applying the required measure will not instantaneously or singlehandedly end overfishing. The United States must take a leadership role in ensuring the sustainable, scientific management of international fisheries, both by promoting these measures internationally and implementing them at home.

Response: There are several strict measures (e.g., landings quota, fins attached provision) that shortfin mako sharks are managed under domestically, and the United States is considered a leader in shark fishery management. Amendment 3 also includes mechanisms for AMs and ACLs for Atlantic sharks. NMFS believes that taking action at the international level through international fishery management organizations to establish management measures to end overfishing of shortfin mako sharks is the most effective way to end overfishing of shortfin mako sharks in the long term without causing significant economic impacts to domestic fishermen in the short term. Sections 102 and 304(i) of the Magnuson-Stevens Act encourage this approach, particularly for species approaching an overfished condition due to excessive international fishing pressure when there are no management measures to end overfishing under an international agreement to which the United States is a party. The shortfin mako shark is part of the pelagic species complex, which currently has defined criteria for MSY, OY, and status determination. NMFS has implemented measures that limit commercial harvest through quotas and trip limits for incidental permit holders that act as measures equivalent to ACLs and AMs, respectively. The 2008 ICCAT SCRS stock assessment did not recommend a TAC or necessary mortality reductions for shortfin mako sharks.

Therefore, it is difficult to determine appropriate catch levels that would help to stop overfishing or be overly restrictive to U.S. fishermen, putting them at a disadvantage compared to international fishermen. NMFS feels that international cooperation is essential at this time in order to determine the level of catch that would stop overfishing on the entire Atlantic stock.

Comment 6: NMFS received several comments regarding the proposed alternative to promote the live release of shortfin mako sharks (alternative C6). One commenter stated that about 90 percent of the shortfin mako sharks that are caught on longlines come to the vessel alive and asked how NMFS would promote the release of shortfin mako sharks. Another commenter questioned the effectiveness of this alternative and questioned the practicability of advising fisheries to release saleable sharks even though they may not be the target of the fisheries that are largely targeting swordfish and tuna. Another commenter stated they did not support alternative C6 because there is no evidence that the alternative will be successful especially given that NMFS recognizes that discards of shortfin mako sharks are rare because their meat is highly valuable. The State of Georgia commented that it is unclear how alternative C6 would impact the meat quality of the shortfin mako kept. Some commenters noted their support for alternative C6. One commenter stated that NMFS should promote the live release of shortfin mako sharks, but should not make it a requirement, and that it is common for the distant water fleet to release live sharks.

Response: According to the PLL observer program reports from 1992-2006, 68.9 percent of shortfin mako sharks are brought to the vessel alive and 30.1 percent come to the vessel dead. Live release of shortfin mako sharks would be voluntary under this action and could be promoted using current HMS outreach mediums (e.g., website, email listserv, mailings) along with others that have yet to be determined. This would allow NMFS to communicate the current status (overfishing occurring) of the North Atlantic shortfin mako shark stock in the hopes that fishermen will voluntarily reduce commercial fishing mortality to avoid a future change in stock status (overfished) that could lead to more restrictive measures. Because additional outreach efforts would likely be developed over time, NMFS is unable to predict how they will impact shortfin mako shark mortality in the commercial fishery. NMFS is unaware of any price differential between shortfin mako sharks that arrive at the vessel alive or dead, and this action is not expected to impact shortfin mako meat quality or ex-vessel prices.

Comment 7: NMFS received multiple comments regarding the shortfin mako stock assessment. Some commenters stated that the United States needs to perform a stock assessment domestically for shortfin mako sharks, separate from the ICCAT assessment. Other commenters asked who conducted the stock assessment and if it was done the same way as other shark stock assessments. One commenter stated that he is concerned with the doubling of the age of maturity and the length of life of the female shortfin mako, while the male shortfin mako did not seem to change in demographics much at all. Another commenter felt that the data used in the stock assessment is outdated and has been flawed for years now. NMFS does not use real time data such as

the 2009 season. The shortfin mako shark population has not changed drastically in the past 8 years.

Response: The North Atlantic shortfin mako shark stock assessment is conducted by the International Commission for the Conservation of Atlantic Tunas' (ICCAT) Standing Committee on Research and Statistics (SCRS) on an international level because of the highly migratory nature of the stock between international jurisdictions. The ICCAT stock assessment uses shortfin mako data from all reporting countries. Therefore, some of the data and assessment approaches used in the ICCAT SCRS shortfin mako shark assessment may differ from the data and approaches used in domestic shark assessments, which are conducted through the Southeast Data, Assessment, and Review (SEDAR) process. In either case, NMFS believes that the data and approaches used in these shark stock assessments represent the best available science. Any changes in shortfin mako size at maturity estimates occurred due to new scientific information, which is considered the best available science at this time.

#### **D.4 Recreational Measures for SCS**

Comment 1: NMFS should implement alternative D2 to modify the minimum size limit for recreationally caught blacknose sharks.

Response: Alternative D2 would modify the minimum recreational size for blacknose sharks based on their biology from 54 inches FL to 36 inches FL. The new restriction would lower the current minimum size for blacknose sharks and could lead to increased landings of blacknose sharks. In order to achieve the TAC recommended by the 2007 blacknose shark stock assessment, NMFS would need to reduce overall blacknose mortality. Since decreasing the minimum size for blacknose sharks could result in increased landings of blacknose sharks, NMFS does not prefer this alternative at this time. Alternative D2 remains a reasonable alternative carried forward for full consideration in the FEIS and remains available for selection by the Agency.

Comment 2: The State of South Carolina and others support the change in the recreational bag limit for Atlantic sharpnose shark from one per person per day, to two per person per day, particularly within the South Atlantic region (alternative D3). The Atlantic sharpnose was listed as not overfished with no overfishing occurring and the SCS quota has also been consistently under harvested in the South Atlantic region. Increasing retention limits for Atlantic sharpnose could mitigate the economic impacts of SCS quota reductions. NMFS has listed the Atlantic sharpnose as a readily identifiable species, and increasing their recreational bag limit should have no negative impact on sandbar, dusky, or blacknose sharks.

Response: NMFS thanks the State of South Carolina for submitting a comment and recreational catch data. Alternative D3 would increase the retention limit for Atlantic sharpnose sharks based on current catches and stock status. Based on the 2007 stock assessment for Atlantic sharpnose, the biomass for Atlantic sharpnose sharks is falling towards the maximum sustainable yield threshold. While the stock is not currently overfished or experiencing overfishing, the latest stock assessment suggests that

increasing fishing effort, such as increasing the retention limit of Atlantic sharpnose sharks, could result in an overfished status and/or cause overfishing to occur. Thus, since increasing the retention limit for Atlantic sharpnose could result in increased fishing effort and result in negative ecological impacts for the stock, NMFS prefers not to implement this alternative at this time. Alternative D3 remains a reasonable alternative carried forward for full consideration in the FEIS and remains available for selection by the Agency.

Comment 3: NMFS received numerous comments regarding the proposed alternative to prohibit the recreational retention of blacknose sharks (alternative D4). Commenters stated that few recreational fishermen target blacknose and since they rarely reach the 54 inch minimum size, Alternative D4 would likely have no impact. Some commenters were concerned that prohibiting the retention of blacknose sharks in the recreational fishery, while allowing retention in commercial fishery, equates to an allocation decision giving 100 percent of the quota to one sector. Other commenters stated that there was no reason recreational anglers should be allowed to retain a species that is overfished. The State of South Carolina commented that NMFS should implement alternative D4 because this action will provide additional protection for blacknose sharks in federal and state waters and help educate the public and fisherman as to the precarious status of the overall blacknose shark population. The State of Georgia does not support alternative D4 since the current size limits in place under the FMP already afford adequate protection for blacknose sharks. Georgia commented that NMFS should look at the recently enacted management of the coastal states relative to shark species and determine where the problems with recreational retention of blacknose sharks are occurring. Georgia supports alternative D1, which would be consistent with the state regulations to the maximum extent practicable. The State of Florida commented that NMFS should not prohibit the retention of blacknose sharks in the recreational fishery, and should, instead, work on other regulations to end overfishing of blacknose sharks. The state's current shark regulations provide conservation and management measures that permit a reasonable and sustainable annual harvest, while additional federal restrictions are not warranted for state waters.

Response: NMFS agrees that few recreational fishermen target blacknose sharks. Based on public comments and the fact that current recreational size limits afford adequate protection for blacknose sharks, the preferred alternative has been changed from alternative D4 in the DEIS which would have prohibited blacknose sharks to D1 in the FEIS, the No Action alternative which maintains the current recreational size and bag limits. NMFS would maintain the existing recreational retention limits for SCS. Recreational anglers are currently allowed one authorized shark per vessel per trip (including SCS). Also, they are allowed 1 bonnethead shark and 1 Atlantic sharpnose shark per person per trip. In addition, there is a recreational minimum size of 54 inches (4.5 ft) FL, which does not apply to Atlantic sharpnose or bonnethead sharks. Blacknose sharks rarely, if ever, reach 54 inches as a maximum size. NMFS believes that these current regulations would continue to provide adequate protection for blacknose sharks in the recreational fishery. However, it may be necessary to increase outreach to recreational fishermen on the identification of blacknose sharks so those that are caught

can be released in a manner that maximizes survival of this species. It may also be necessary to work with states to ensure consistent regulations and enforcement.

Comment 4: If NMFS prohibits the retention of blacknose sharks in the recreational fishery, how will this impact ASMFC member states?

Response: If NMFS adds a particular species to the prohibited species list, according to the ASMFC Interstate Coastal Shark FMP, the member states would need to implement management measures that would provide a conservation equivalency for blacknose sharks or states could decide to mirror NMFS regulations. However, in the DEIS, NMFS was not proposing to add blacknose sharks to the prohibited species list. Rather, in the DEIS, NMFS proposed not authorizing recreational possession of blacknose sharks. Thus, under the proposed management measure in the DEIS, ASMFC regulations would not be affected unless ASMFC took action to be consistent with federal regulations.

Comment 5: Recreational fishermen cannot reliably identify blacknose sharks. If the retention of blacknose sharks is prohibited in the recreational fishery, NMFS will need to implement an outreach program to educate recreational anglers.

Response: Based on public comments and the fact that current recreational size limits afford adequate protection for blacknose sharks, the preferred alternative has been changed from alternative D4 in the DEIS which would have prohibited blacknose sharks to D1 in the FEIS, the No Action alternative which maintains the current recreational size and bag limits. Currently, NMFS has recreational shark identification placards that categorize the differences between the recreational sharks. The placards can be attained on the HMS website (<http://www.nmfs.noaa.gov/sfa/hms/sharks/>) or by contacting the HMS division at 301-713-2347. In the future, NMFS could cooperate with states to increase identification of this species in state waters as a larger portion of the recreational catches of blacknose sharks occurs in state waters.

## **D.5 Recreational Measures for Pelagic Sharks**

Comment 1: NMFS received comments in support of the No Action alternative (alternative E1).

Response: Based on the 2008 ICCAT SCRS stock assessment for shortfin mako sharks, NMFS has determined that the North Atlantic population is experiencing overfishing. Under the Magnuson-Stevens Act, if NMFS determines that a fishery is overfished or is approaching an overfished condition due to excessive international fishing pressure and there are no management measures to end such overfishing in an international agreement to which the United States is a party, it must take action at the international level to end overfishing (16 U.S.C. §§1854, 1854 note). The ICCAT stock assessment did not provide a recommended TAC or mortality reductions to prevent overfishing of shortfin mako sharks, making it difficult to set a quota or other limits to prevent overfishing. Because there are currently no ICCAT measures to end overfishing of shortfin mako sharks and U.S. shortfin mako shark landings have comprised

approximately nine percent of international landings from 1997 through 2007, NMFS believes that taking action on an international level to end overfishing of shortfin mako sharks is necessary at this time.

The No Action alternative would allow the recreational harvest of one shortfin mako shark greater than 54 inches fork length per vessel per trip. The preferred alternatives to work on an international level to end overfishing and promoting the live release of shortfin mako sharks will not change the current recreational shortfin mako shark size or bag limits.

Comment 2: NMFS received several comments regarding the minimum size for recreational shortfin mako fishing (alternative E2). Comments included: Recreational limits for shortfin mako should be one fish per trip of any size; we are requesting a bag limit of two mako sharks and a minimum size of 72 inches FL (182.9 cm FL) - this minimum size should apply to all fishermen, recreational and commercial; NMFS should implement a realistic minimum size like the minimum length requirement of 66 inches (167.6 cm) in the Annual Mako Mania Tournament; and NMFS should adopt alternative E2b, which increases the minimum size for recreational fishers from 54 to 73 inches, fork length - this coupled with the preferred alternatives for shortfin mako management, represent an integrated strategy that will immediately reduce shortfin mako harvest while aspiring to make long-term, systemic changes in both international management of and domestic attitudes toward the shortfin mako fishery.

Response: Two size limits were analyzed for the recreational shortfin mako shark fishery based on the estimated size of sexual maturity of females (108 inches FL) and the estimated size of sexual maturity of males (73 inches FL). Large Pelagic Survey (LPS) data from 2004 to 2008 was used to estimate the impact of the proposed size limits on recreational shortfin mako shark landings from tournament and non-fishing tournament activities. This analysis found that 99.5 percent of all recreational landings fell under the proposed 108 inch FL size limit, and 60.3 percent of all recreational landings fell under the proposed 73 inch size limit. The 73 inch FL size limit would have a greater impact on non-tournament landings, as 81 percent of the non-tournament landings fell under the 73 inch size limit compared to 51.7 percent of the tournament landings. Implementing either of these size limits would reduce a large percentage of shortfin mako shark landings from a fishery that contributes a small percentage of the overall North Atlantic shortfin mako shark landings, would likely not end overfishing on the stock, and could have negative social and economic impacts. Therefore, NMFS believes that ending overfishing and preventing an overfished status would best be accomplished through development of management measures at the international level to be adopted and implemented by the United States and other nations.

Comment 3: NMFS received several comments, including from the State of South Carolina, in support of the proposed alternatives E3 and E4. Commenters felt that those measures should assist in overall shortfin mako recovery while not becoming overly burdensome to the U.S. sector of the fishery that is not chiefly responsible for the current stock status. However, NMFS also received several comments that did not support the

proposed alternative. These commenters noted that with recreational fishing tournaments actively targeting shortfin mako sharks, offering large prizes for their capture, and placing a high value on retaining them as trophies, it is difficult to see how promoting a voluntary live release measure will have any effect on the species' mortality. These commenters also note that shortfin mako sharks are highly valued, both as one of the few sharks generally deemed "edible" and as a recognized "trophy" to be weighed and displayed upon capture. Operators of for-hire vessels are unlikely to release a legal-sized mako over the objections of their fares. While a significant proportion of the recreational shark fishery is comprised of anglers who say they practice catch-and-release, exceptions to that general practice are often made when a shortfin mako is brought to boatside.

Response: NMFS agrees that working on an international level to reduce overfishing and promoting the live release of shortfin mako sharks is the best course of action to take at this time. Because the United States contributes very little to shortfin mako shark mortality in the North Atlantic, ending overfishing and preventing an overfished status may be better accomplished through international efforts with other countries that have large takes of shortfin mako sharks. NMFS believes that this action is appropriate at this time rather than implementing restrictive management measures unilaterally, which could unilaterally disadvantage U.S. fishermen. Promoting the release of shortfin mako sharks that are brought to the vessel alive, and the NMFS Code of Angling Ethics (64 FR 8067), could result in the reduction of fishing mortality of shortfin mako sharks and thus, have positive ecological impacts for this species. In promoting the live release of shortfin mako sharks, recreational fishermen will have the opportunity to reduce shortfin mako shark mortality with the intent to maintain the stock and avoid an overfished determination, which could lead to new restrictions on the U.S. recreational fishery. Outreach efforts will be developed over time, therefore, NMFS is unable to predict how they will impact shortfin mako shark mortality in the recreational fishery.

Comment 4: NMFS should implement alternative E5, prohibit landing shortfin mako sharks in recreational fisheries, or at least prohibit landings in fishing tournaments. NMFS acknowledges that shortfin mako sharks could meet two of the most important of the four criteria that lead to being listed as a prohibited species (i.e., there is sufficient biological information to indicate the stock warrants protection and the fact it resembles other prohibited species). NMFS has rejected this alternative simply because it would have a significant effect on commercial fishery revenue (over a quarter of a million dollars annually) and it would inhibit expansion of the pelagic longline fleet. Further, NMFS speculates that prohibiting retention could result in increased dead discards. This rationale is inadequate.

Response: Placing shortfin mako sharks on the prohibited species list would result in a recreational catch and release fishery for this species. NMFS decided not to prohibit landing of shortfin mako sharks in the recreational fishery because of the small numbers of shortfin mako sharks landed in the recreational fishery in comparison to international landings, prohibiting the possession of U.S. caught shortfin mako sharks is unlikely to end overfishing on the stock, and given the importance of shortfin mako sharks in recreational fishing tournaments. If shortfin mako are prohibited in the commercial fishery, increases in dead discards mainly apply to the commercial PLL fleet,

where over 30 percent of shortfin mako caught are dead at haulback. In the recreational fishery, post-release mortality rates for shortfin mako sharks are generally believed to be low when injuries from hooking and releasing the shark are minimized, therefore, NMFS would not anticipate a significant increase in dead discards with a recreational shortfin mako shark retention prohibition. NMFS believes that the preferred alternatives to work internationally to end overfishing of shortfin mako sharks, and to promote the live release of shortfin mako sharks domestically are adequate at this time.

Comment 5: The EPA notes that the DEIS is unclear regarding the impact of shortfin mako shark landings attributed to the recreational fishery in comparison to landings from the commercial fishery. Alternatives E2a and/or E2b, which are similar to the commercial size limit alternatives, should be preferred, since an increase in size limits could have significantly positive ecological impact upon this species and would lead to a large majority of the recreationally caught shortfin mako sharks to be released alive.

Response: In the DEIS, NMFS calculated average annual recreational shortfin mako shark landings from ICCAT estimates from 1981 to 2007. Because there were no ICCAT landings estimates available for the commercial shortfin mako shark fishery from 1981 to 1991, the impact of the recreational fishery on shortfin mako shark mortality may have been inflated. In the FEIS, NMFS compares recreational and commercial ICCAT estimates of shortfin mako shark landings over years where data for both fisheries are available (1992-2008). This analysis shows that shortfin mako shark landings from the U.S. commercial (109,611 sharks landed) and recreational (110,256 sharks landed) fisheries are similar over that time series. Implementing the size limits proposed in Alternatives E2a or E2b will reduce a large percentage of shortfin mako shark landings from a fishery that contributes a small percentage of the overall North Atlantic shortfin mako shark landings. Therefore, implementing size limits would unnecessarily disadvantage U.S. fishermen in relation to those from other countries who also contribute to shortfin mako shark mortality. NMFS believes that ending overfishing and preventing an overfished status would best be accomplished through development of management measures at the international level to be adopted and implemented by the United States and other nations.

Comment 6: NMFS received a comment that asked about the post release survival for shortfin mako sharks.

Response: Scientific studies have not been conducted regarding the post-release survival of North Atlantic shortfin mako sharks caught in U.S. commercial or recreational fisheries, therefore, it is currently unknown for these fisheries. A study by Hight et al. 2007, estimated the post-release survival of shortfin mako sharks caught on PLL gear at approximately 80 percent. This research was conducted in the Pacific Ocean off of California using different gear (J hooks) and shorter soak times (~3 hours) than in the U.S. Atlantic PLL fishery. Therefore, it may be representative of the post-release survival of North Atlantic shortfin mako sharks caught in the U.S. Atlantic PLL fishery. In the recreational fishery it is believed that post-release survival is very high, especially

when injuries from hooking and releasing the shark are minimized and fishermen release sharks in a way that maximizes their survival.

Comment 7: NMFS says that the U.S. catch proportion is less than 10 percent. Last year, the data was extrapolated and the range was between 4-5 percent. If that is correct, NMFS is overstating the relevancy of the U.S. catch to the entire Atlantic-wide mortality. The United States is not a big player in the shortfin mako shark fishery. Canada and Spain will determine the fate of shortfin mako sharks at ICCAT.

Response: The proportion of U.S. shortfin mako shark catch referred to in the DEIS was calculated from estimated commercial shortfin mako shark landings and discards reported to ICCAT from 1997 to 2008, which is approximately 9 percent of the Atlantic-wide shortfin mako shark landings over that time period (3431 mt ww / 39,769 mt ww = 8.6 percent). This indicates that the United States contributes a small proportion to the overall fishing mortality on the North Atlantic shortfin mako shark stock.

Comment 8: Several commenters felt that the proposed alternatives would close the shortfin mako recreational fishery.

Response: NMFS considered five alternatives for pelagic sharks in the recreational fishery, and only one, adding shortfin mako sharks to the prohibited species list, would prohibit recreational landings of shortfin mako sharks. The preferred alternatives, working on an international level to end overfishing and promoting the live release of shortfin mako sharks, will not prohibit landings of shortfin mako sharks or close the recreational fishery.

## **D.6 Smooth Dogfish**

Comment 1: NMFS received several comments in support of the No Action alternative (alternative F1), mirroring ASMFC smooth dogfish regulations. For example, the State of North Carolina opposed the preferred alternative F2, and supported alternative F1 under the smooth dogfish management measure. The State of Virginia and other commenters support Alternative F1 as their preferred option, but could also support Alternative F3. The State of Virginia believes Addendum I to the ASMFC Coastal Shark FMP is a compromise between the ease of species identification for Law Enforcement and the need by the commercial fishery to completely process smooth dogfish at sea due to their rapid spoilage. The State feels that the current ASMFC management regime for smooth dogfish should allow NMFS to take no action at this time (alternative F1) or to add smooth dogfish under NMFS management and mirror the provisions of the ASMFC Interstate Shark FMP (alternative F3). Similarly, the MAFMC supports the No Action alternative (alternative F1) since the fishery is not a growth fishery and landings have been stable. The MAFMC also commented that if no action (alternative F1) is selected, the Council would support requesting ASMFC to adopt mandatory dealer reporting requirements and establish a quota consistent with alternative F2a3. The MAFMC also noted that if NMFS determines that it will implement federal management, then as a secondary choice the MAFMC supports alternative F3 for smooth dogfish.

Response: Because smooth dogfish is not currently a federally managed species and fishery data reporting is not required, catch, effort, and participant data are sparse. These smooth dogfish data limitations have led to an unknown stock status and an unknown condition of the fishery. One way to rectify these shortcomings and to abide by the Magnuson-Stevens Act mandate to prevent overfishing while achieving optimum yield, is to bring smooth dogfish under federal management. Achieving the Magnuson-Stevens Act mandate will require the collection of smooth dogfish fishery data to perform stock assessments and effort estimates. NMFS chose not to prefer the No Action alternative (Alternative F1) because maintaining the status quo would perpetuate the unknown condition of the fishery. Furthermore, because the resource is available along most of the eastern U.S. coasts and there is a market for the product, smooth dogfish effort could increase as other fisheries become more constrained.

NMFS chose not to prefer Alternative F3, mirroring the ASMFC smooth dogfish measures, because the ASMFC plan contains some provisions that NMFS cannot implement and does not include others that NMFS must implement. On May 6, 2009, the ASMFC approved a smooth dogfish Addendum to the Atlantic Coastal Sharks FMP for public comment. Included within this Addendum is an exception for smooth dogfish to allow at-sea processing (*i.e.*, removal of shark fins while still onboard a fishing vessel), removal of recreational retention limits for smooth dogfish, and removal of the two hour net-check requirement for shark gillnets. The at-sea processing would require a five-percent fin to carcass ratio, but would allow for the removal of fins at sea. The allowance for the removal of shark fins while still onboard a fishing vessel and the removal of the two hour net-check requirement differs from current federal regulations for other shark species. NMFS considers the requirements for gillnet checks and maintaining shark fins naturally attached through offloading to be important to minimize impacts on protected resources and to prevent shark finning, respectively. NMFS recently implemented the fins attached regulation for all Atlantic sharks for enforcement and species identification reasons and does not favor creating a potential loophole that could hinder enforcement. In addition, ASMFC has not established a quota or a permitting requirement for the smooth dogfish fishery. As noted above, NMFS is required to establish ACLs and AMs under the Magnuson-Stevens Act and believes that permitting is the first step to gaining information about the fishery. Thus, NMFS is not preferring to mirror the ASMFC regulations at this time. Nonetheless, if NMFS implements alternative F2, NMFS would delay implementation of the management measures until the beginning of the smooth dogfish season in 2012 and in the interim, continue to work with ASMFC and the MAFMC to ensure federal and state regulations are consistent to the extent practicable.

Requiring that fins remained naturally attached to the smooth dogfish carcass is important to NMFS for several reasons: to facilitate species identification; to maintain consistency with other shark regulations that require the fins remain attached while keeping the carcass essentially whole; and to maintain consistency with the United States' international shark conservation and management positions. Identifying all sharks to the correct species is a vital step in vessel and dealer reporting. These reports are used to monitor catch levels in relation to quotas and to advise stock assessments. When ASMFC implemented their regulations allowing the removal of smooth dogfish fins during certain seasons, they only considered the potential overlap in species distribution

between sandbar and smooth dogfish. They did not consider the potential overlap with many other species of sharks that NMFS manages including SCS and spiny dogfish and the potential for misidentification with these species. NMFS heard during the proposed rule comment period that participants in the smooth dogfish fishery fully process the fish into “logs” or fillets of meat at sea. Identifying the species of fully processed carcasses from cuts of meat is very difficult. For this reason, for a number of years before requiring fins be attached in 2008, NMFS had prohibited the filleting of sharks at sea and required all sharks be landed as logs. In the 2006 Consolidated HMS FMP, NMFS took a further step of requiring the second dorsal and anal fin be maintained on the dressed carcass. Furthermore, the ability to identify both carcasses and fins to the species level is critical for enforcing the prohibition on shark finning for all federally managed Atlantic shark species. The most effective way for fishermen, dealers, and enforcement to properly identify both fins and carcasses is to require fins remain naturally attached through offloading. Detached smooth dogfish fins can be difficult for most people to differentiate from other shark fins. Differentiating numerous detached smooth dogfish fins from other shark fins can be inefficient and impractical from an enforcement perspective, particularly in a high volume fishery.

All sharks currently managed by the Secretary (large coastal sharks, small coastal sharks, and pelagic sharks) must be landed with fins naturally attached. Deviating from this measure in the smooth dogfish fishery would introduce management inconsistencies and potential enforcement loopholes. The fins naturally-attached regulation is also consistent with the U.S. international position on shark conservation and management. Globally, shark finning is a serious threat to many shark species. The United States has co-sponsored fins attached proposals and supported an international ban on the practice of shark finning and has recently proposed adding several species to the CITES Appendix II listing to aid in monitoring shark fin trade. An effective method to enforce this ban, particularly in areas lacking enforcement resources, is to require fins remain naturally attached to the shark carcass through offloading. In addition to this requirement, the United States also encourages maintaining the five percent fins to carcass ratio. The five percent fin to carcass ration is a critical tool for dockside enforcement when enforcement officers are unable to monitor an entire offload, and enhances shark conservation efforts by allowing NOAA to utilize dealer landing records to detect potential shark finning violations post-landing for subsequent follow-up investigation. If domestic exemptions to the fins naturally attached regulation were implemented, it could undermine the United States’ international position on the fins naturally attached policy and other shark conservation and management measures.

While NMFS is obligated by the regulations published by the Council on Environmental Quality to identify its preferred alternative, the FEIS is not a decision document and the Agency retains the discretion to select any reasonable alternative evaluated in the FEIS, including the No Action alternative and alternative F3. While NMFS has expressed a preference in the FEIS for bringing smooth dogfish into federal management and establishing a permitting process, the agency has made no final decision in this regard and will not do so until the final Agency review of the FEIS and other relevant documents and signs a Record of Decision selecting final alternatives.

Comment 2: Several commenters asked what would happen if NMFS decided not to implement management actions (alternative F1). They asked if it would mean that the ASMFC would be the sole managers of smooth dogfish.

Response: Whether NMFS decided to implement management measures or not, ASMFC regulations would not apply in federal waters. The jurisdiction of ASMFC management plans only includes state waters, and the absence of a federal management plan would not extend ASMFC's jurisdiction. While smooth dogfish are not currently managed at the federal level, there are federal regulations in place that apply to smooth dogfish fishing in the EEZ, including the Shark Finning Prohibition Act. This Act prohibits landing shark fins without the corresponding carcass and in excess of 5 percent of the carcass weight. If NMFS decides not to implement management measures, these federal regulations will still apply. This comment did not require any revision in the FEIS.

Comment 3: NMFS received comments supporting the proposed alternative (alternative F2), which would implement management measures in the smooth dogfish fishery. Several commenters noted that this alternative would also require issuance of federal permits, which are essential in remedying the serious deficiencies in data and would lead to better stock assessments. The preferred alternative of federal management has the added benefit of obtaining dealer reports and providing for federal fishery observers aboard vessels targeting dogfish. The State of Georgia supported the proposed alternative and noted that as ASMFC has recognized the importance of smooth dogfish, it is only fitting that NMFS should also consider responsible management of this species in federal waters.

Response: NMFS believes that implementing federal management measures, should the species be brought under NMFS management, would be an important first step in meeting its Magnuson-Stevens Act mandate to prevent overfishing while achieving, on a continuing basis, optimum yield. Achieving this mandate would require the collection of smooth dogfish fishery data to perform stock assessments and effort estimates. Federal permits, dealer reporting, and on board observers would provide valuable participant information and better characterize the nature of the fishery. The ASMFC's action to include smooth dogfish in the coastal shark management plan is further indication of emerging awareness that the species is in need of management measures. Due to the highly migratory nature of smooth dogfish and its large range, it would provide a positive ecological benefit across their range regardless of political boundaries. The DEIS identified alternative F2 as the preferred alternative and no change was made in the FEIS except that the implementation of the measures under the preferred alternative would be delayed until the beginning of the smooth dogfish fishing season in 2012 to allow time for fishery participants to adjust to the new requirements.

Comment 4: NMFS received many comments specific to the five percent fin to carcass ratio for smooth dogfish, including that the 5 percent ratio is too low and that the ratio should be closer to 10-12 percent. The MAFMC commented smooth dogfish are

unique in their fin to carcass ratio. They have two dorsal fins that are large enough to retain and sell. The carcasses are typically sold with the napes removed, rather than split, which significantly reduces the weight basis of the carcass and increases the fin to carcass ratio. The fins are removed with a straight cut, rather than the crescent cut required for other shark fins, thereby increasing its weight and the fin to carcass ratio. As a result, the fin to carcass ratio for smooth dogfish is typically 9 to 10 percent if the two pectoral fins and two dorsal fins are retained. The tails are not typically retained due to their low value, but if they are retained, the total fin weight increases to 13 to 14 percent.

Response: On December 21, 2000, the Shark Finning Prohibition Act (PL 105-557) (Act) was signed into law. The Act established a rebuttable presumption that any shark fins landed from a fishing vessel or found on board a fishing vessel were taken, held, or landed in violation of the Act if the total weight of shark fins landed or found on board exceeded five percent of the total weight of shark carcasses landed or found on board. It was implemented by NMFS through a final rule released in February 11, 2002 (67 FR 6124). Thus, any changes to the five percent ratio would have to be modified by Congressional actions. NMFS does not have discretion to selectively implement the five percent fin to carcass ratio in certain shark fisheries. Furthermore, difficulty in abiding by the five percent fin to carcass ratio further supports NMFS' requirement that all smooth dogfish fins remain naturally attached to the carcass through offloading. Keeping the fins naturally attached to the carcass through offloading makes it easier for fishermen to comply with the Shark Finning Prohibition Act. In order to help fishermen document that sharks were landed with their fins attached NMFS modified the dealer reporting forms so that it can be clearly documented that the sharks were landed with fins attached. NMFS did not add an additional alternative to the FEIS to seek a change in legislation in response to this comment.

Comment 5: The MAFMC encourages NMFS to address Section 307 (1) (P) of the Magnuson-Stevens Act as it relates to the smooth dogfish fishery, and suggests exploring a Letter of Authorization for the fishery addressing the rebuttable presumption clause. The smooth dogfish fishery fully utilizes the carcasses, so there is no conservation purpose served for this species by the five percent limit fin to carcass ratio.

Response: Section 307(1)(P) of the Magnuson-Stevens Act states that “[i]t is unlawful (1) for any persons to... (P)(i) remove any of the fins of a shark (including the tail) and discard the carcass of the shark at sea; (ii) to have custody, control, or possession of any such fin aboard a fishing vessel without the corresponding carcass; or (iii) to land any such fin without the corresponding carcass.” The section continues that “[f]or the purposes of subparagraph (P) there is a rebuttable presumption that any shark fins landed from a fishing vessel or found on board a fishing vessel were taken, held, or landed in violation of subparagraph (P) if the total weight of shark fins landed or found on board exceeds 5 percent of the total weight of shark carcasses landed or found on board.”

As noted in the previous response, NMFS has no discretion in selectively implementing the five percent fin to carcass ratio in certain shark fisheries, therefore, NMFS cannot issue Letters of Authorizations to exempt fishermen from complying with

the Magnuson-Stevens Act and statutory requirements of the five percent fin to carcass ratio.

Comment 6: NMFS received comments specific to the proposed requirement that smooth dogfish fins remain naturally attached to the carcass (alternative F2) including: NMFS must require that smooth dogfish be landed with their fins naturally attached since allowing an exemption for smooth dogfish will undermine the overall management and protection of sharks. NMFS also received comments opposed to the actions including: the fins attached requirement will end the commercial smooth dogfish fishery and would have no conservation value for smooth dogfish; requiring fins remain naturally attached to the carcass in the summer will reduce the meat quality because fishermen will have to remove the fins in 95 degree heat while on the dock; requiring fins remain naturally attached to the carcass will cause the meat to spoil faster; NMFS stated that their intention was not to change the fishery, but all the proposed requirements, particularly requiring fins remain naturally attached, will change the fishery; NMFS should adopt a rule that mirrors the provisions approved by the ASMFC, which requires that the smooth dogfish fins need not be landed attached, except for the dorsal fin during the months of July through February; and, the fishery is a 98 percent directed fishery, with little or no by-catch of other shark species. The State of South Carolina recommends that NMFS consider allowing permitted commercial shark fisherman to process and remove fins from smooth dogfish at sea, with the exception of the 1st and 2nd dorsal fins. This would allow these landed sharks to be differentiated from other species, including sandbar sharks. The MAFMC commented that smooth dogfish flesh is uniquely soft and translucent, and is singular among shark species in its tendency to discolor if the fish is not promptly bled, thoroughly rinsed to remove any remaining blood, and iced. This unique attribute of the fish requires at-sea processing. The fins and tails have always been removed and, in some cases, the backs and fins are sold to different customers. Requiring the fins and tails to remain attached would substantially impede the bleeding and cleaning process that is essential to preventing discoloration and preserving the quality of the fish.

Response: The FEIS (Section 4.3) acknowledges and considers the concerns raised in this comment with respect to potential difficulties resulting from the inability to completely process smooth dogfish at sea. However, were NMFS to assume management responsibility of the federal smooth dogfish fishery, it would require that fins remain naturally attached to the carcass to facilitate species identification, and to prevent exceptions to the federal prohibition on shark finning. The requirement would also maintain consistency across all Secretary of Commerce managed shark species in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea and would reflect the U.S. international position regarding shark conservation. While the fins naturally attached requirement would apply to federal smooth dogfish fishing permit holders regardless of fishing location, the intent of the measure would not be to obviate the ASMFC measures, as suggested in one of the comments. The ASMFC and NMFS operate under different mandates, jurisdictions, and contexts (domestic and international). These differences sometimes result in, and can necessitate, different management measures.

NMFS' intention, when implementing smooth dogfish management measures, would be to minimize alterations to the fishery. Additionally, NMFS would delay the effective date of the management measures under the preferred alternative until the beginning of the fishing season in 2012 to allow fishermen and dealers time to adjust to the new requirements. Smooth dogfish management measures would not be implemented until the 2011 fishing season, and NMFS believes that the methods and techniques employed in other shark fisheries can be adopted in the interim. However, the practices currently employed in the fishery are sometimes in conflict with NMFS' shark conservation position and Congressional mandates. As noted in several of the comments above, requiring smooth dogfish fins to remain naturally attached to the carcass differs from the current practice in the fishery. As described in the response to a comment above, NMFS deemed that maintaining a fins-attached requirement would be critical for several reasons: 1) to facilitate species identification, 2) to maintain consistency across all federally managed shark species, and 3) to maintain consistency with the U.S. and NMFS international position with regard to shark conservation and management. A potential NMFS requirement to land smooth dogfish with fins naturally attached would not prohibit at-sea processing methods currently in place in most other Atlantic shark fisheries that maximize meat quality, freshness, and processing efficiencies. It would remain legal to remove the shark's head and viscera for proper bleeding. To reduce dock-side processing needs, all fins could be partially cut at the base and only left attached via a small flap of skin. NMFS did not add an additional alternative to the FEIS to seek a change in legislation in response to this comment.

Comment 7: NMFS received comments regarding the proposed quota for smooth dogfish (alternative F2a3). Numerous commenters stated that the proposed quota was too high for a species lacking a stock assessment and that has been categorized as near threatened by the International Union for the Conservation of Nature (IUCN). NMFS also received numerous comments stating that the proposed quota is too low such as: in the early 1990s, Virginia alone caught over a million pounds and North Carolina or New Jersey could easily take the proposed quota themselves in the next year or two without increasing effort. The amount of take in the fishery depends on whether the fish are available when the fishermen go out. The quota needs room for growth since there are a lot of fishermen targeting smooth dogfish. Several commenters stated that the data used to determine the quota were flawed since a lot of people are not reporting on the vessel trip reports (VTRs) and that NMFS needs to look at all sources and geographic regions (including the Gulf of Mexico) of mortality including trawl gear. NMFS also received comment that the Service should not set a smooth dogfish quota the first year and should set quota the second year based on landings data. The State of Virginia commented that the absence of a statistically sound time series of landings or any type of analytical stock assessment for smooth dogfish makes this quota alternative impractical. Quota-based management requires some current information on the status (biological) of the stock. The State of Virginia also noted that there are approximately twelve commercial fishermen that land in excess of 500 pounds of smooth dogfish during any one year from 2004 through 2008 in Virginia. For the five year period of 2004 through 2008, Virginia's smooth dogfish harvest totaled 2,316,648 pounds. A total of 1,140,809 pounds were harvested from state waters (49.2 percent) and 1,175,839 pounds from federal waters (50.8 percent). The State of South Carolina supports federal management

of smooth dogfish and the proposed method of determining the annual commercial and recreational landings, plus the addition of 6 mt ww of smooth dogfish to the present 60 mt ww quota for all sharks collected in exempted fishing programs. The State of Georgia supports the quota limit for the smooth dogfish fishery, since the logic used to calculate the quota appears sound at this time. The MAFMC states that NMFS commercial landings data shows zero smooth dogfish landings from Virginia for 1996, while greater than 500,000 lbs are known to have been purchased by a single Virginia dealer in that year. The MAFMC recommends that the collection of fishery data through mandatory logbook reporting be initiated as soon as possible if federal management is taken. The data collection will help develop a stock assessment.

Response: The Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (P.L. 109-479) amended National Standard 1 of the Act to require the establishment of Annual Catch Limits (ACLs) and Accountability Measures (AMs) in federally managed fisheries. The mechanism by which this requirement is applied to shark fisheries is detailed in Chapter 1 of the FEIS for Amendment 3, including the necessity to establish an annual commercial quota. Despite sparse smooth dogfish landings reports and the lack of a stock assessment, establishing an annual quota would be a condition of bringing the species under federal management under the Magnuson-Stevens Act.

Inline with the intention to minimize changes to the fishery, NMFS proposed to establish a quota that would allow current exploitation levels of smooth dogfish to continue. Although some changes to fishery would be necessary as noted above (e.g. fins naturally attached), the primary goal of the smooth dogfish portion of this amendment is to characterize and collect data on the fishery. This goal necessitates a quota near actual exploitation levels. Due to the lack of reporting requirements in the fishery, NMFS relied on available data to estimate current landing levels. Despite the lack of management, many fishermen in the mid-Atlantic region have been reporting their landings. Some of these fishermen have federal permits for other species and are required to report all landings, including smooth dogfish, due to the regulations in those other fisheries. Other fishermen do not have federal permits and report smooth dogfish landings voluntarily. These landings, and the number of vessels reporting these landings, have remained fairly constant since the late 1990s. Existing sources, particularly the Atlantic Coastal Cooperative Statistics Program (ACCSP) for commercial catches across all gear types, offer insight into the current state of the fishery. NMFS used ACCSP data to estimate current landing levels and then used this estimate to establish an annual quota. In the DEIS, NMFS proposed a quota equal to the maximum annual landings between 1998 and 2007 plus one standard deviation in the ACCSP data. Setting the quota higher than maximum reported landings was intended to account for what NMFS believes to be significant underreporting due to the lack of smooth dogfish reporting requirements. During the public comment period, however, NMFS received numerous comments that the proposed quota does not adequately account for underreporting. Several states provided state data that also indicated the sources NMFS used may be underreporting actual landings. Based on these comments and Southeast Fishery Science Center (SEFSC) advice, NMFS has decided to deviate from the preferred alternative in the DEIS and to identify alternative F2a4, the quota equal to the annual maximum landings plus

two standard deviations, or 715.5 mt dw (1,577,319 lbs dw), as the preferred alternative in the FEIS. NMFS believes that setting the quota at a level that accounts for current landings does not threaten smooth dogfish stocks. A review of the reported landings does not indicate any declining trend, and as noted by one of the commenters, the average size of landed smooth dogfish is increasing. Based upon these data and this observation, there is no indication that the smooth dogfish stock is unhealthy. The IUCN status appears to be based upon the fact that smooth dogfish have an unknown stock status. The IUCN description of smooth dogfish notes that there is no stock assessment for the species. Regardless, NMFS does not rely on IUCN statuses when developing management measures, but rather uses peer-reviewed stock assessments and primary literature. Smooth dogfish landings have been stable since the mid-1990s and there is no indication of stock declines. Once more data is gathered on this species a stock assessment could be completed. If the species were brought under federal management, NMFS would reassess the quota at that time and make any necessary changes.

Comment 8: NMFS received several comments relating to the set-aside quota for research on smooth dogfish. One commenter noted that Alternative F2b1 provides for a “set-aside” quota for an exempted fishing program. It is appropriate for NMFS to establish this set-aside, though clearly this should be subtracted (set aside) from the total quota and not provided as an additional quota. The State of South Carolina believes the quota for smooth dogfish landed in exempted fishing programs is adequate, and notes that they have several public aquaria and 3 to 4 researchers in the state who have permits to collect sharks. None of those permit holders have expressed concerns to the State about the proposed quota. The State of Georgia noted that the set aside amount for the exempted fishing program is reasonable.

Response: NMFS prefers the alternative to establish a separate smooth dogfish set-aside quota for the exempted fishing program of 6 mt ww. The set-aside quota for the exempted fishing permit (EFP) program is an important part of any fishery management plan. The EFP program facilitates research that can be used to inform management measures and provide data for stock assessment. Creating a separate and distinct set-aside quota from the principle quota ensures that research activities do not impede the commercial or recreational fisheries through quota limitations. As noted in the previous response, NMFS’ intention when establishing the commercial quota was to set it a level that would account for all annual commercial landings. For this reason, it is not prudent to subtract the set-aside quota from the overall commercial quota. Doing so would result in a smaller commercial quota that might not fully account for the current annual commercial landings. In the future, after performing a stock assessment and characterizing the fishery, adjustments could be made to the set-aside quota as well as the commercial quota.

Comment 9: Any differences between the NMFS and ASMFC plans will complicate smooth dogfish fishing since fishermen will have a difficult time following the regulations. There must be coordination between ASMFC and NMFS.

Response: On January 1, 2010, the ASMFC Coastal Sharks FMP, which includes smooth dogfish measures in Addendum I, was implemented across most of the Atlantic

coast states. The ASMFC plan contains several measures that differ from NMFS', as detailed in the response to Comment 1 of this section, resulting in a few inconsistencies between the two plans. NMFS recognizes the importance of consistent regulations between state and federal waters for both stock health and ease of compliance. While complimentary ASMFC and NMFS plans are not possible at this time, NMFS would work closely with the ASMFC toward similar management measures and would consider any future changes to the ASMFC plan to ensure measures are as consistent as possible between state and federal waters. As additional data from the fishery becomes available and the fishery becomes more fully characterized, NMFS would have better information to inform collaboration and future management measures. NMFS is aware of and disclosed the potential inconsistencies between the ASMFC Coastal Shark FMP and federal management of smooth dogfish under the Magnuson-Stevens Act in the FEIS (Section 4.3).

Comment 10: The State of Virginia noted that having fins attached would significantly change how the fishery is prosecuted and smooth dogfish fishermen would shift all their effort into state waters. By shifting effort from federal to state waters, Alternative F2 provokes an unintended consequence of increasing the likelihood of interaction between smooth dogfish gear and several stocks of bottlenose dolphin that spend the majority of the year within state waters.

Response: NMFS recognizes that differences in federal and state smooth dogfish regulations could redistribute effort resulting in a fishery that is no longer equally divided between state and federal waters. However, regardless of where fishing activities occur, protected resource interactions are a concern, and care must be taken to avoid or minimize impacts on marine mammals and sea turtles. In federal waters, smooth dogfish fishermen will be required to abide by both the gillnet and other requirements in 50 CFR part 635 and with the regulations implemented under various Take Reduction Plans (TRPs) in 50 CFR part 229 to minimize adverse impacts on protected resources. Although NMFS does not have jurisdiction over the smooth dogfish fishery in state waters, Section 118 of the Marine Mammal Protection Act (MMPA) tasks NMFS in the development and implementation of TRPs to reduce serious injuries and mortalities of marine mammal populations incidental to commercial fishing activities. These TRPs have numerous requirements to minimize impacts on marine mammal populations and are applicable in both state and federal waters. The permitting requirement in the preferred alternative should enhance the ability of smooth dogfish fishermen to participate in these TRPs. Numerous TRPs exist, including the Bottlenose Dolphin Take Reduction Plan (BDTRP), which smooth dogfish fishermen will have to abide by if fishing in Virginia state waters. Specific regulations pertinent to the BDTRP can be found at 50 CFR 229.35. Any redistributed effort into Virginia's state waters affecting bottlenose dolphins will be addressed under the BDTRP or other applicable TRP.

In addition, NMFS is currently engaged in formal Section 7 consultation in accordance with the ESA, paragraph 7(a)(2), to determine the potential level of incremental effect that may arise as a result of the preferred management measures for smooth dogfish in the FEIS. NMFS has not yet issued a final BiOp for the smooth dogfish fishery. NMFS will review that BiOp once it is issued and supplement the

analysis in this FEIS if the consultation reveals any new or significant effects with respect to the interaction between gillnet fishing for smooth dogfish and protected species that were not considered in the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP. The FEIS incorporates by reference the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP. A detailed discussion of the effects of such management relevant to the shark fishery is included in that document. NMFS does not anticipate any substantial change in impact to protected species since the measures proposed for smooth dogfish management are largely administrative, and thus unlikely to affect the manner and extent of fishing for smooth dogfish or redistribution of effort into other fisheries. NMFS assumes there is a correlation between fishing effort and protected species interactions. Since smooth dogfish management measures would establish a quota and permit requirement, fishing effort for smooth dogfish would be capped or slightly reduced with a corresponding diminishment of the possibility of increased protected resource interactions. In addition, increased observer in the smooth dogfish fishery as a result of a federal permit requirement would better characterize protected resources interactions with the smooth dogfish fishery.

Comment 11: Florida fishermen catch smooth dogfish in the Tortugas and use them as bait because smooth dogfish are worthless. Gulf of Mexico fishermen catch them while grouper fishing. If you catch 5,000 lbs of grouper, you might have about 50 lbs of smooth dogfish. The common length is 12-24” and they are caught at the top of the continental shelf. NMFS should not include rules made for the mid-Atlantic in the Gulf of Mexico. If smooth dogfish are causing problems in the mid-Atlantic, NMFS should establish separate regulations on them. Fishermen in the Gulf of Mexico cannot fish for anything without catching a few smooth dogfish. There are no smooth dogfish fisheries in the Gulf of Mexico.

Response: Smooth dogfish is a widely distributed species, ranging from Massachusetts to South America including the Gulf of Mexico and Caribbean Sea (see Chapter 11). Despite this wide distribution, the current fishery is concentrated in the Mid-Atlantic region, and no reports of commercial landings in the Gulf of Mexico could be found. Although there are no reported landings of smooth dogfish in the Gulf of Mexico, research trawls by the SEFSC have shown that they are present in the region including in Louisiana waters (see Chapter 11 in Amendment 3). Fishermen in the Gulf of Mexico that incidentally catch smooth dogfish, but do not retain the fish or parts of the fish, will not be required to abide by federal smooth dogfish regulations or need to obtain a smooth dogfish permit.

Under current Atlantic HMS regulations, it is illegal to catch sharks and use them as bait. If smooth dogfish were under federal management, this requirement would apply to smooth dogfish as well. The known distribution of smooth dogfish, validated by comments such as this one, necessitates a central, unified management authority of the species. The fact that a market exists for smooth dogfish, and that they are regularly encountered in places other than the Mid-Atlantic, make management measures and data collection in the fishery important. Even though fishermen do not currently land smooth dogfish in the Gulf of Mexico, the presence of both the resource and a market means a fishery could develop in that region, particularly if other more profitable fisheries are

reduced or limited. NMFS did not add an alternative in the FEIS to separate the smooth dogfish into separate management units or fisheries in response to this comment.

Comment 12: Why will recreational fishermen be required to have a smooth dogfish permit? Would the recreational permit for smooth dogfish be the same as the current HMS recreational permit? Most of the smooth dogfish are caught incidentally. No one targets smooth dogfish recreationally. The State of South Carolina notes that few smooth dogfish are landed in their recreational fishery as that species primarily occur off our coast in the winter months when angler effort is decreased.

Response: Efforts to characterize the smooth dogfish fishery must include both commercial and recreational fishermen to adequately estimate effort and catch. As when recreationally fishing for other Atlantic sharks, smooth dogfish recreational fishermen would need to obtain an HMS Angling Permit and charter/headboats that take smooth dogfish would need to obtain a HMS Charter/Headboat permit. Those who already hold this permit will not need an additional permit to fish for smooth dogfish recreationally.

Comment 13: The State of South Carolina commented that, unless future stock assessments indicate that smooth dogfish are overfished, the current commercial and recreational size and retention limits seem appropriate.

Response: NMFS agrees that at this time there is no justification for imposing a size or retention limit for smooth dogfish in the recreational or commercial fishery. This is inline with the intent to minimize changes to the fishery while collecting data to characterize it. Currently, the fishery does not operate under any type of size or retention limit restrictions. After a stock assessment is completed on the species, changes could be necessary.

Comment 14: A few commenters noted that the EFH for smooth dogfish proposed by NMFS looks appropriate. The State of South Carolina agrees that the occurrence data presented is where dogfish are captured within U.S. waters. However, the State notes that there is a discontinuity between the Gulf of Mexico and the Atlantic coast groups (as presented in Figure 11.1 of Amendment 3) that may indicate further investigation of species characteristics and distribution is warranted.

Response: Identifying and describing EFH for federally managed species is a statutory requirement mandated by the Magnuson-Stevens Act. As detailed in Chapter 11, NMFS used a variety of research survey datasets to identify and describe the EFH around positive smooth dogfish observations. Although NMFS relied on geographically limited datasets, the resulting EFH designation closely matches literature descriptions of smooth dogfish distribution, boosting confidence in the determination. The NEFSC offered suggestions on available research survey datasets. Once incorporated, these datasets contributed to a more robust smooth dogfish designation than that proposed in the DEIS of Amendment 3. The discontinuity in EFH off the Georgia and eastern Florida coasts will require further analysis due to the lack of smooth dogfish data in the area. However, literature on smooth dogfish distribution also note an absence of the species in

that area. As noted, NMFS incorporated changes to its identification and description of EFH in the FEIS based on this and similar comments.

Comment 15: NMFS stated in Amendment 3 that there is not sufficient information for smooth dogfish EFH. If that is the case, why did NMFS propose EFH?

Response: As noted in the previous response, identifying and describing EFH for federally managed species is a statutory requirement mandated by the Magnuson-Stevens Act. Although NMFS is confident that the designated smooth dogfish EFH is accurate, particularly after incorporating the datasets suggested by the NEFSC, NMFS will work to ensure that EFH for all HMS species utilizes the best available information. No changes were made in the FEIS based on this comment.

Comment 16: NMFS received several comments questioning whether smooth dogfish is a highly migratory species (HMS) and should be managed by NMFS or a Regional Fishery Management Council, such as the MAFMC. Commenters stated that the Magnuson-Stevens Act defines HMS as an “oceanic shark” and asked if smooth dogfish are oceanic sharks. Commenters also asked why spiny dogfish are managed by the MAFMC and NEFMC. One commenter stated that NMFS should manage smooth dogfish fisheries since it is the only Atlantic shark species, which is subjected to a targeted fishery that has no federal management measures. That commenter also felt a federal management component would likely enhance new management efforts by the ASMFC.

Response: The Magnuson-Stevens Act is the primary statute giving fishery management authority to NMFS, which is then executed by the Secretary, and the Regional Fishery Management Councils. In most cases, Regional Fishery Management Councils have authority for fisheries management for stocks and species within each Council’s geographic jurisdiction as established by the Magnuson-Stevens Act. The only exception to this management authority is for Atlantic HMS that are within the geographic authority of more than one of the five Atlantic Councils. For this reason, management of Atlantic HMS was unified by the Magnuson-Stevens Act under the Secretary of Commerce. The Act defines Atlantic HMS through two subsections and one National Standard: Section 3 (21), Section 302 (3), and Section 301(3) (National Standard 3). These sections read as follows:

Section 3 (21): The term "highly migratory species" means tuna species, marlin (*Tetrapturus* spp. and *Makaira* spp.), oceanic sharks, sailfishes (*Istiophorus* spp.), and swordfish (*Xiphias gladius*).

Section 302 (3): The Secretary shall have authority over any highly migratory species fishery that is within the geographical area of authority of more than one of the following Councils: New England Council, Mid-Atlantic Council, South Atlantic Council, Gulf Council, and Caribbean Council.

Section 301(3) (National Standard 3): To the extent practicable, an individual stock of fish should be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

Magnuson-Stevens Act Section 3 (21) defines HMS. Unlike some other HMS, sharks mentioned in the definition are not defined by family or species. Rather, the term “oceanic shark” is used. The statute does not further expound upon or define this term. NMFS, therefore, considered two major factors in making its determination with respect to smooth dogfish. First, it considered the life history, habitat, migratory patterns, occurrence and distribution of the species. Second, NMFS considered its interpretation in the context of the various provisions of the Magnuson-Stevens Act applicable to HMS to ensure that its interpretation was logical and consistent with those provisions. Given the broad application of the term in conjunction with the habitat, migratory patterns and geographic distribution of the species, smooth dogfish is fairly characterized as an oceanic shark consistent with the structure and application of the Magnuson-Stevens Act. A more detailed rationale follows.

NMFS examined Section 302 (3) and Section 301 (3) (National Standard 3). Both of these sections relate to management authority based on the distribution of the species. As noted in Chapter 11, smooth dogfish inhabit the geographical area of all five Atlantic Regional Fishery Management Councils, and across international boundaries to South America and Mexico. As noted in Chapter 11, smooth dogfish tend to be found inshore during the warmer months. However, thermally stable, deep offshore waters are preferred in the colder months (up to 200m) and Caribbean populations occupy waters deeper than 200m. Data from research surveys show that smooth dogfish are found along the eastern seaboard, in the Gulf of Mexico, and in the Caribbean Sea. Based on these factors, NMFS reasonably concluded that the smooth dogfish is an oceanic shark and, given its range across multiple Atlantic Regional Fishery Management Council Jurisdictions, highly migratory. Moreover, management of smooth dogfish under a single FMP is consistent with the Magnuson-Stevens Act’s mandates for the Secretary to manage highly migratory species to the extent practicable as a single management unit.

Despite extensive investigation, NMFS could not locate records detailing the decision to grant the MAFMC management authority over spiny dogfish. Existing spiny dogfish management authority does not impact management authority of smooth dogfish.

Comment 17: Multiple commenters asked who requested federal smooth dogfish management.

Response: NMFS received smooth dogfish management requests from a number of environmental conservation organizations. Furthermore, around the time of scoping for Amendment 3, both the ASMFC and the MAFMC identified that smooth dogfish were in need of conservation and management and began the process of creating management measures. These efforts by the ASMFC and the MAFMC reinforce the emerging realization that the fishery is in need of both state and federal management.

Comment 18: NMFS should work with the small group of fishermen that fish for smooth dogfish to gather info on the fishery rather than proposing new requirements.

Response: Although a specialized fishery with perhaps a smaller number of fishermen than other fisheries, the smooth dogfish fishery still includes a large number of participants. Within the Vessel Trip Report (VTR) and Coastal Fisheries Logbook databases, an average of 213 vessels per year reported landing smooth dogfish between 2004 and 2007. This large number of participants makes collaboration with each of the smooth dogfish participants impracticable. However, under the smooth dogfish preferred alternative, alternative F2, implementation of management measures will be delayed until the beginning of the smooth dogfish fishing season in 2012. This delay will allow NMFS to continue outreach and have discussions with smooth dogfish participants regarding the fins attached regulation and will allow fishery participants time to modify their operation to comply with the regulations that will be implemented in 2012. A discussion of the smooth dogfish fishery is included in the FEIS (Section 4.3).

Comment 19: NMFS should ensure that smooth dogfish will be available year round. The January 1 opening for smooth dogfish could be good for North Carolina, since it is a winter fishery. It would affect North Carolina fall catch rates if the fishery became quota-limited.

Response: Inline with the intention to minimize changes to the fishery, NMFS decided to establish a quota that would allow current exploitation levels of smooth dogfish to continue. NMFS believes that the established quota is at a sufficient level to prevent quota limitations if the fishery maintains current landing levels. Because there are no regional or seasonal restrictions included in the preferred alternative, the quota should be available year-round, and no specific region or state will disproportionately benefit from the quota. NMFS plans to open the fishery each year with a Federal Register notice that would likely publish near the beginning of each year.

Comment 20: One commenter noted that smooth dogfish fishermen fish several nets at once, with short soak times. It would change the fishery if NMFS required the nets to remain attached to the vessel. The State of South Carolina commented that the smooth dogfish gillnet fishery has been practiced for some time in North Carolina and the Mid-Atlantic States. If during this time there have been no or few problems associated with interactions with endangered or protected species, the State sees no reason to increase restrictions or change the way the fishery has historically been prosecuted. One commenter noted that the two hour net checks probably would not hurt smooth dogfish fishermen since the soak time is short. However, fishermen cannot do net checks with a flashlight looking down into the water because the nets are set deep. Also, net checks will be difficult to enforce. Another commenter stated that NMFS should extend existing gillnet gear tending requirements to smooth dogfish fishermen, such as requiring that gillnets be checked at least every two hours and that protected and prohibited species are released. Gillnets frequently catch non-target species, including prohibited shark species, marine mammals, and sea turtles. The nature of the gear makes some level of bycatch nearly unavoidable.

Response: NMFS agrees that the requirement to keep gillnets attached to the vessel and to perform net checks could alter how the smooth dogfish fishery operates. Smooth dogfish fishermen will be required to abide by federal Take Reduction Plans specific to the region of fishing activity. These plans include the Atlantic Large Whale Take Reduction Plan, the Bottlenose Dolphin Take Reduction Plan, and the Mid-Atlantic Harbor Porpoise Take Reduction Plan that include requirements to keep gillnets attached to the vessel and to perform net checks in order to minimize interactions with protected resources and to ensure those that are incidentally caught are released in a manner that maximizes survival.

NMFS is currently engaged in formal Section 7 consultation in accordance with the ESA, paragraph 7(a)(2), to determine the potential level of incremental effect that may arise as a result of the preferred management measures for smooth dogfish in the FEIS. NMFS has not yet issued a final BiOp for the smooth dogfish fishery. NMFS will review that BiOp once it is issued and supplement the analysis in this FEIS if the consultation reveals any new or significant effects with respect to the interaction between gillnet fishing for smooth dogfish and protected species that were not considered in the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP. The FEIS incorporates by reference the 2008 BiOp for Amendment 2 to the 2006 Consolidated HMS FMP. A detailed discussion of the effects of such management relevant to the shark fishery is included in that document. NMFS does not anticipate any substantial change in impact to protected species since the measures proposed for smooth dogfish management are largely administrative, and thus unlikely to affect the manner and extent of fishing for smooth dogfish or redistribution of effort into other fisheries. NMFS assumes there is a correlation between fishing effort and protected species interactions. Since smooth dogfish management measures would establish a quota and permit requirement, fishing effort for smooth dogfish would be capped or slightly reduced with a corresponding diminishment of the possibility of increased protected resource interactions. In addition, increased observer in the smooth dogfish fishery as a result of a federal permit requirement would better characterize protected resources interactions with the smooth dogfish fishery.

Under the preferred alternative (F2), the implementation of the management measures would be delayed until the beginning of the smooth dogfish fishing season in 2012 to allow time to consider and evaluate the information and requirements included in the final smooth dogfish BiOp. If the assessment of effects in the BiOp provides new and meaningful information not considered in this FEIS, NMFS will supplement the FEIS, as appropriate, before implementing any management measures proposed in alternative F2. In the interim, NMFS will not impose any management authority or related conservation and management measures on the smooth dogfish fishery, and thus will not cause any effect on protected species related to such management. In other words, preferred alternative F2 would maintain the status quo with respect to the smooth dogfish fishery as it relates to protected species prior to receiving a final BiOp. While NMFS would finalize the rulemaking with measures for blacknose shark and shortfin mako sharks becoming effective 30 days after publication of the final rule in the Federal Register, the measures, if any, selected for management of smooth dogfish would be deferred to allow

NMFS to develop reasonable and prudent alternatives (RPAs) that could be implemented while avoiding adverse impacts to listed species, as necessary

Comment 21: Trawl fishermen skin smooth dogfish at sea and sell them as steaks.

Response: Under federal management, trawl fishermen will likely not be able to continue skinning smooth dogfish at sea, and will not be able to continue processing the fish into steaks at sea. Smooth dogfish, like all other federally managed Atlantic shark species, would be required to be landed with fins naturally attached to the carcass under the current preferred alternative, alternative F2. Trawl fishermen could continue to skin the shark if they can leave the fins naturally attached to the carcass, but they will be unable to process the smooth dogfish into steaks at sea. NMFS did not add an alternative in the FEIS which would exempt trawl fishermen from complying with the prohibition on filleting sharks at sea and the requirement to land smooth dogfish with fins attached in response to this comment.

Comment 22: NMFS might cause an influx of new fishermen into the fishery with the new open access permits.

Response: NMFS acknowledges that there may be some fishermen who will obtain a permit and try to establish a catch history in case the fishery is changed to limited access at some point in the future. There may also be some fishermen in areas that do not currently have a smooth dogfish fishery, such as in the Gulf of Mexico, who may obtain a permit in the hopes of creating a similar fishery in that region. However, NMFS does not believe that the creation of a smooth dogfish open access permit will attract large numbers of new fishermen to the fishery or cause a large increase in fishing effort. The fishery is currently unmanaged in federal waters and operates with few restrictions. Although NMFS has tried to minimize changes to the fishery, federal management does introduce new restrictions, including a requirement to keep fins naturally attached to the carcass. If fishermen did not choose to enter the fishery when it was unmanaged, it is unlikely that federal management would entice them to enter actively fish now. A discussion of the socio-economic impacts of bringing the smooth dogfish fishery under federal management is included in the FEIS (Section 4.3).

Comment 23: NMFS should proceed with a stock assessment for smooth dogfish throughout their range. The State of Virginia suggested that pooling resources between ASMFC, NMFS, and MAFMC may expedite the process.

Response: A stock assessment is of utmost importance in any fishery management plan. Knowing the current biomass and how it relates to  $B_{msy}$  or to virgin stock biomass informs quota levels and size and retention limits. NMFS believes that the first step in working toward a stock assessment is collecting data and characterizing the fishery. Once NMFS has sufficient data from the fishery a stock assessment could be done in the future to determine the stock status of this species. These are the goals of the smooth dogfish measures in the preferred alternative for Amendment 3 as explained in the FEIS (Section 4.3). NMFS would work closely with ASMFC, MAFMC and other interested parties in conducting a stock assessment.

## **D.7 General Comments**

Comment 1: Is there a mechanism in place for ASMFC to request that the Secretary implement complementary management measures in the EEZ?

Response: The ASMFC is always encouraged to offer management recommendations to NMFS regarding federally managed species. Furthermore, NMFS included an alternative in the FEIS to implement smooth dogfish management measures that mirror ASMFC measures. However, after analyzing the smooth dogfish measures in place in the 2009 Interstate Coastal Sharks FMP and Smooth Dogfish Addendum I, NMFS determined that it would likely be unable to implement many of the management measures due to Magnuson-Stevens Act, and Shark Fining Prohibition Act requirements.

Comment 2: NMFS needs to add deepwater sharks to the list of prohibited shark species. Deepwater sharks are particularly slow growing and therefore vulnerable to overfishing, and related populations have been severely and rapidly depleted from fisheries in other parts of the world.

Response: Implementing federal management of deepwater sharks by placing them on the prohibited list would not likely have significant ecological benefits since deepwater sharks are not currently targeted in any fishery and are only caught as bycatch. Placing this group on the prohibited list would not prevent bycatch of these species. Additionally, prohibiting the landing of deepwater sharks would limit data gained from incidental catches. If prohibited, these rarely encountered species would have to be released and could not be landed and submitted for subsequent analysis. Establishing management measures for deep water sharks is beyond the scope of Amendment 3 and does not meet the purpose and need described in the DEIS and FEIS. Alternatives for such measures were therefore not considered in the FEIS.

Comment 3: Deepwater sharks are not commercially important in the United States for food. NMFS needs to truly understand the fisheries that interact with deepwater sharks and be able to assess the deepwater shark stocks accurately, especially if there is a bycatch that is or could become a secondary market landing and sale.

Response: As noted in the previous response, deepwater sharks are rarely encountered and only caught as bycatch. NMFS encourages anyone who catches a deepwater shark to submit the shark to scientists for research.

Comment 4: We are concerned about the accuracy of some of the statistics presented on recreational fishery “harvest.” For example, NMFS states that the number of porbeagle sharks that were “harvested” by recreational fishermen across all reporting years was zero. Tournaments regularly target this species and award prizes for landing them. Additionally, NMFS shows that annual harvest of sand tiger sharks was zero for the reporting years except for 2001 when 604 were taken and 2006 when 1,040 were killed. It is hard for us to see how the recreational fishery took over 1,000 sand tiger sharks in a single year, more than a decade after they were listed as a prohibited species.

As such, we are concerned about the reliability of the data used by NMFS as a basis for determining impacts on species.

Response: Collection of recreational fishery catch and effort data relies on survey methods. Data are collected through a combination of dockside intercepts and telephone surveys. Since it is not possible to sample all of the millions of fishing trips taken, recreational surveys require sampling a representative portion of fishing trips, and then expanding the results. Recreational harvest estimates for species that are rarely landed, as is the case with many shark species, are typically very imprecise using survey methods designed for more commonly caught species. Marine Recreational Fisheries Statistics Survey (MRFSS) estimates of sharks harvested may also be inaccurate due to the fact that the MRFSS does not sample at tournament locations. The NOAA Fisheries Large Pelagics Survey (LPS), which is conducted from Maine through Virginia, typically produces more reliable recreational catch estimates for rare event species such as sharks, tunas, and billfish. However, landings of species such as porbeagle and sand tiger sharks are still rare events even for the LPS, and variances can be quite large for these species even with a specialized survey. Efforts are underway to improve the accuracy and precision of recreational fisheries data, including estimated catches of rare event species, through a new data collection initiative called the Marine Recreational Information Program or MRIP. NMFS believes the data on recreational harvest, particularly for purposes of SCS species addressed under Amendment 3, reflects the best scientific information available at this time. Therefore, recreation harvest data was not changed in the FEIS in response to this comment.

Comment 5: Sharks need to be available all year and low quotas lead to regulatory discards. Fishermen do not need a directed shark permit to sell sharks caught in NC waters.

Response: In Amendment 2 to the 2006 Consolidated HMS FMP, NMFS implemented a trip limit of 33 non-sandbar LCS trip limit with the expectation that directed shark permit holders would no longer target non-sandbar LCS and that this reduced trip limit would allow the non-sandbar LCS quota to last year-round. However, the 2009 non-sandbar fishery opened on January 23<sup>rd</sup> and closed on July 1st in the Atlantic and June 6th in the Gulf of Mexico. Because the non-sandbar LCS seasons only lasted half of the year, NMFS is currently looking at data and analyzing management measures that would allow the fishery to remain open for longer periods during the fishing year. Adjusting seasons and quotas for non-SCS species is beyond the scope of Amendment 3 and the FEIS, therefore, NMFS did not propose management alternatives in response to this comment.

Many states do not have species-specific commercial fishing permits, and instead rely on a general commercial fishing permit. Fishermen who fish in states waters must comply with their state's fishing regulations. Fishermen that have a directed or incidental federal shark commercial permit must abide by federal regulations and must sell to a federally permitted dealer when fishing in federal or state waters.

Comment 6: The frequency of shark dealer reporting has always needed to be more frequent than every two weeks. It appears that the NMFS personnel have a hard time monitoring the various shark landings as a result of waiting too long.

Response: Frequency of shark dealer reporting requires a balance of data needs and reporting burdens. More frequent reporting could result in a reduction in data lags, however, it would significantly increase the burden of shark dealers. To account for uncertainties such as data lags, the Magnuson-Stevens Act requires AMs in each fishery to ensure that ACLs are not exceeded. In the shark fisheries, NMFS employs an AM whereby the fishery is closed when landings reach, or are expected to reach, 80 percent. This measure has been effective in ensuring that data lags do not result in grossly exceeding the quota. NMFS provides shark landings reports, by complex or species on a frequent basis to ensure that participants are aware of catches in the shark fishery. NMFS is examining changes to the data management structure and may move toward more real time electronic reporting in the future. However, these types of data management actions are beyond the scope of Amendment 3 and alternatives were therefore not proposed in the FEIS in response to this comment.

Comment 7: A Count, Cap and Control system for shark management includes the following: obtaining sufficient landings and observer data to accurately and precisely monitor catch (landings + discards) in the fishery; conducting species-specific stock and fishery assessments; setting annual catch limits to limit all sources of fishing mortality; and implementing accountability measures to ensure the ACLs are respected. Real-time management of quotas, time-area management measures and bycatch caps should be fully explored in this FMP amendment. If the agency decides not to use in-season AMs, it must fully support this decision with a well-defended rationale as to why in-season AMs are truly impossible, rather than impractical or incrementally more difficult to administer. The agency should take a precautionary approach towards administering the remaining quota designations for the oceanic whitetip and common thresher sharks within the pelagic shark species group. There are currently no stock assessments for either the oceanic whitetip or the common thresher sharks. In the past 10 years, the North Atlantic population of oceanic whitetip sharks has declined by an estimated 70 percent. NMFS should reassess their management of pelagic shark species. It is vital that each pelagic shark species caught by U.S. fishermen have a species-specific stock assessment and a species-specific quota.

Response: This amendment specifies how NMFS plans to implement Magnuson-Stevens Act NS1 ACL requirements. Section 1.2 of the FEIS details the methodology, where the quota is equal to the landings comment of the commercial sector ACL. Additionally, AMs already in place in the commercial shark fishery will be maintained. These AMs include restrictions on how to carry over under- and overharvests and closing the fishery when landings reach, or are expected to reach, 80 percent. Changes to how NMFS monitors the landings, introducing time/area closures, or altering bycatch management are not addressed in this amendment as they do not support the purpose and need of this rulemaking. Therefore, management alternatives suggested by this comment were not included in the FEIS.

NMFS has not conducted a stock assessment for oceanic whitetips. Data may be a limiting factor, however, as there are limited landings data for oceanic whitetip sharks. NMFS will continue to work with international partners and ICCAT towards more species-specific assessments for pelagic sharks. To date, ICCAT has completed assessments for blue and shortfin mako sharks. There is scant data available on oceanic whitetip landings. Again, management of the pelagic shark complex other than shortfin mako is beyond the scope of Amendment 3 and would not meet the purpose and need set forth in the FEIS. Therefore, additional pelagic shark management measures (other than for shortfin mako) were not included in the FEIS in response to this comment.

Comment 8: What is the NMFS doing about hammerheads? There is a real problem there along with tiger sharks. NMFS should stop focusing on blacknose and focus on more critical species such as hammerheads.

Response: This amendment, among other things, focuses on NMFS' requirement under the Magnuson-Stevens Act to implement a rebuilding plan and ACLs and AMs in the blacknose shark fishery since this species is overfished and overfishing is occurring based on the 2007 SCS stock assessment results. NMFS continually monitors stocks of all species under its jurisdiction and promptly begins the rulemaking process should one of these stocks be determined to be overfished or have overfishing occurring based on the results of a stock assessment. The LCS complex was assessed in 2006 through the SEDAR process, and this assessment determined that there was not enough information for a tiger shark-specific assessment. For this reason, tiger sharks have an unknown stock status. NMFS is aware of a hammerhead assessment published in a peer reviewed journal and is reviewing that paper to determine its appropriateness for use in making stock status determinations and implementing management measures. Management of hammerhead and tiger sharks is beyond the scope of Amendment 3 and would not meet the purpose and need set forth in the FEIS. Therefore, additional management measures for these species were not included in the FEIS in response to this comment.

Comment 9: If NMFS is conducting a stock assessment on sandbar in 2010, NMFS should consider the stock north of Virginia that usually is not included because there is no fishery there. When you shut down the commercial sandbar fishery, you said it was because they were overfished but there are places you are not assessing.

Response: NMFS uses the best available science and a rigorous SEDAR assessment process for all sharks species. NMFS held a public data workshop for the 2005/2006 LCS stock assessment and requested that participants submit any relevant data or analysis. NMFS included all the available data that were presented at the data workshop for the LCS stock assessment, including fishery-dependent and fishery-independent data from all regions in the Atlantic, Gulf of Mexico and the Caribbean Sea. Data inputs for the stock assessment are not solely fishery-dependant, therefore, geographical limitations of the fishery do not skew the stock assessment results. Management of sandbar sharks is beyond the scope of Amendment 3 and would not meet the purpose and need set forth in the FEIS. Therefore, additional management measures for these species were not included in the FEIS in response to this comment.

Comment 10: Requiring fins be naturally attached does not work for SCS. Some dealers are not renewing their permits because they are afraid of getting in trouble with the requirement. Other dealers do not have room to process fish on the dock.

Response: NMFS does not believe that the requirement to land sharks with fins attached is overly burdensome for the following reasons. The requirement to land sharks with fins attached would allow fishermen to leave the fins attached by just a small piece of skin so that the shark could be packed efficiently on ice while at sea. Shark fins could then be quickly removed at the dock without having to thaw the shark. Sharks may be eviscerated, bled, and the head removed from the carcass at sea. These measures should prevent excessive amounts of waste at the dock, since dressing (except removing the fins) the shark may be performed while at sea. While this would result in some change to the way in which fishermen process sharks at sea, because the fins may be removed quickly once the shark has been landed, NMFS expects that the dealers will not require significantly more room for post-landing processing. Dealers have the option to accept or decline certain species, and federal smooth dogfish regulations would not eliminate that option. For these reasons NMFS did not propose an alternative for consideration in the FEIS which would permit landing of SCS without fins naturally attached to the shark carcass.

Comment 11: What is happening regarding the legislation in place to allow flexibility in the MSA and how does that impact Amendment 3?

Response: NMFS is aware of the Flexibility in Rebuilding American Fisheries Act of 2009 (HR 1584) sponsored by Rep. Pallone (NJ). The Act would amend the Magnuson-Stevens Act and alter the rebuilding deadlines currently in place for overfished stocks. This legislation, however, has not passed either house of Congress, and NMFS is unable to speculate on whether or not it will ultimately pass. At this time, the Magnuson-Stevens Act, as it exists after the 2007 reauthorization, is NMFS' guiding legislation for this amendment.

Comment 12: Is there a possibility of changing the SCS fishery start date to July 1?

Response: The SCS fishing year runs from January to December. The actual fishing season starts when NMFS publishes a notice in the Federal Register. NMFS could delay the opening of the SCS fishing season if data indicate that it is appropriate to do so. In the proposed 2010 Shark Season Rule (October 28, 2009, 74 FR 55526), NMFS proposed to delay the opening of the 2010 SCS shark season until after the publication of Amendment 3 to the 2006 Consolidated HMS FMP. Without a delay in the start date, the 2010 SCS fishery would open under the current quota of 454 metric tons (mt) dressed weight (dw) on the effective date of the final rule for the 2010 Atlantic shark specifications. Amendment 3 proposes, among other things, measures to significantly reduce the non-blacknose SCS and blacknose shark quotas in order to rebuild and end overfishing of blacknose sharks and also establishes a mechanism for implementing annual catch limits (ACLs) and accountability measures (AMs). A delay would also allow time for the establishment of ACLs before the start of the 2010 fishing season in

addition to ensuring the SCS fishery opens under the measures that may be established in Amendment 3. Additional measures to delay the shark season opening are not proposed or considered in the FEIS as they are beyond the scope of Amendment 3 and otherwise provided for under existing regulation.

Comment 13: Is NMFS considering catch shares for the shark fishery?

Response: A catch share is the allocation of the available fishery quota among participants within the fishery. LAPPs are one type of catch share program. These programs may be implemented to address numerous issues, including but not limited to: ending the race for fish, reducing overcapitalization, and improving efficiency and safety, while still addressing the biological needs of a stock. These programs can be designed to meet the specific needs of a fishery, provided they meet the requirements outlined in the Magnuson-Stevens Act. Catch shares were not considered for the shark fishery in this amendment because of the ramifications this type of program would have for the existing permit structure and the time required for implementing these programs.

To properly design a catch share program that appropriately considers the views and interests of all stakeholders and then implements such a system would have taken NMFS several years, and therefore, catch shares were not considered a reasonable alternative for this action given the mandate in subsection 304(e) of the Magnuson-Stevens Act to rebuild the blacknose stock in the shortest time possible and the additional requirement of paragraph 303(a)(15), as implemented by the National Standard 1 Guidelines, to have a mechanism for specifying ACLs and AMs in place for stocks experiencing overfishing by 2010. However, NMFS is considering revisions to the existing permit structure within HMS fisheries. This could include a catch share program for sharks as well as other HMS as was discussed during the September/October 2008 HMS Advisory Panel. NMFS published an ANPR on June 1, 2009 (74 FR 26174), to initiate broad public participation in considering catch shares for HMS fisheries. But establishing a catch share program is beyond the scope of Amendment 3 and does not meet the purpose and need set forth in the FEIS. Catch share options, therefore, were not included or considered in the FEIS.

Comment 14: Blacknose sharks eat newly hatched sea turtles. Your proposal to rebuild blacknose sharks will impact sea turtle populations.

Response: NMFS is bound by the Magnuson-Stevens Act requirements to stop overfishing of blacknose sharks, and to rebuild stocks to a non-overfished status. The Office of Sustainable Fisheries works closely with the Office of Protected Resources to ensure actions in the fishery do not jeopardize the continued existence of protected resources.

Comment 15: Commercial fishing for all shark species should be done using rod and reel only to reduce bycatch.

Response: Although rod and reel often has reduced bycatch of non-target species, this gear is not commonly used in the commercial fishery to target sharks. Gears that are

more commonly used in shark fisheries, such as gillnets and longlines, do have some risk of bycatch however there are bycatch mitigation measures in place in the Atlantic shark fishery that reduce interactions and increase post-release survival of protected resources. Chapter 3 of this document details the numerous measures in place to minimize bycatch in these fisheries. The proposal to restrict commercial shark gear to rod and reel was not included or evaluated in the FEIS in response to this comment.

## **D.8 Economic Comments**

Comment 1: Fishermen cannot sell sharks anymore. Most sharks used to go to the Midwest where there was a stable market. Those markets needed 6 to 8 months of lead time, but that market is gone now. Dealers will buy some meat (\$0.20/lb) because they can resell it as bait.

Response: Permitted commercial shark fishermen are currently allowed under the regulations to sell authorized shark species to permitted dealers. NMFS examined the commercial shark fishing revenues over the past eight years in Chapter 6 of the Draft EIS. Total ex-vessel revenues from small coastal shark meat has fluctuated between approximately \$535,000 and \$823,000 annually over that period with no discernable pattern.

NMFS provided median real ex-vessel prices for shark species groups from 2004-2007 in Table 6.7 of the Draft EIS. The median ex-vessel price for small coast shark meat from 2004-2007 was \$0.66 per pound dressed weight. NMFS acknowledges there is significant seasonal and regional variation in dealer prices. The lowest average ex-vessel median average price was for smooth dogfish, \$0.29 per pound dressed weight, which is similar to the price the commenter indicated dealers are paying.

Comment 2: Did NMFS look at the monetary figures? If you spread the small SCS quota across all the permit holders, there is not enough quota for everyone.

Response: NMFS examined the per vessel impacts of the proposed SCS quotas across all permit holders in Chapter 8 of the Draft EIS. Based on data from 2004 to 2007 for directed and incidental shark permit holders that landed non-blacknose SCS, the average directed shark permit holder earned \$9,427 in average annual gross revenues, and the average incidental shark permit holder earned \$707 in average annual gross revenues from non-blacknose SCS landings. For those permit holders that actually landed blacknose shark during that same time period, the average directed shark permit holder earned \$3,640 in average annual gross revenues, and the average incidental shark permit holder earned \$1,722 in average annual gross revenues from blacknose shark landings.

NMFS acknowledges that the availability of SCS quota proposed in the DEIS would be limited if spread across all permit holders. As described in the responses above, NMFS made changes to the SCS quotas based, in part, on the comments received. The preferred alternative in the FEIS for small coastal sharks is now 221.6 mt versus 56.9 mt preferred under the DEIS. The preferred alternative for blacknose shark quota was raised from 14.9 mt under the DEIS to 19.9 mt in the FEIS.

Comment 3: Multispecies fishermen need every species they can catch. The economic impacts on these multispecies fishermen were not considered.

Response: NMFS examined the cumulative economic impacts of the proposed rule in section 4.11 of the DEIS and FEIS.

Comment 4: The fins attached rule decreased effort on SCS because it is too much work processing the sharks twice in hot weather. Prices are lower for SCS because the fins on rule decreased the quality due to increased processing time.

Response: NMFS acknowledges that the fins on rule could decrease the quality of the product due to increased processing time. However, other factors such as market demand and decreased supplies might also affect prices. NMFS will examine the impacts that leaving fins on sharks is having on prices for SCS as information becomes available.

Comment 5: Shortfin mako sharks are a significant secondary bycatch for the US pelagic fishing fleets from Maine to Texas. Like most sharks this is a shared resource with other countries. NMFS is unilaterally proposing to hurt US fishermen first with economic impacts.

Response: NMFS acknowledges that mako shark is often a bycatch species in other fisheries in the United States. The preferred alternatives for the commercial shortfin mako shark fishery will not change the current retention limits for U.S. fishermen at this time. NMFS will promote the live release of shortfin mako sharks, but will not make it mandatory for the fishery. NMFS is proposing to take action at the international level to end overfishing of shortfin mako sharks through participation in international fisheries organizations such as ICCAT. While the proposed alternatives could impact U.S. fishermen economically before it impacts fishermen in other countries, neither of these measures are expected to have a significant economic impact on U.S. commercial fishermen.

Comment 6: The preferred alternative that would eliminate the recreational fishery is, in fact, an allocation decision that gives 100 percent of the blacknose shark TAC to the commercial sector. There are no analyses of the economic benefits to the nation associated with this allocation. Such an economic analyses is required.

Response: Blacknose sharks rarely reach a size greater than the current federal minimum size; therefore, the current 54 inch FL size limit creates a de facto retention prohibition of blacknose sharks in federal waters. As discussed in the DEIS, NMFS determined that prohibiting the retention of blacknose sharks in the recreational fishery under alternative D4 could have some negative social and economic impacts on recreational fishermen, including tournaments and charter/headboats, if the prohibition of blacknose sharks resulted in fewer charters. However, since blacknose sharks are not one of the primary species targeted by recreational anglers, in tournaments or on charters and they rarely reach a size greater than the current federal minimum size, NMFS estimates

limited negative social and economic impacts from alternative D4 on recreational anglers, tournaments, or in the charter/headboat sector.

In the FEIS, alternative D1 is the preferred alternative because the effect is the same as prohibiting the retention of blacknose sharks, thereby contributing to the rebuilding of the species. NMFS chose to prefer this alternative rather than the previously preferred alternative, alternative D4, because the effect is the same, therefore action is unnecessary.

Comment 7: A few commenters, including the State of Virginia, noted that there is no indication that finning has been, is, or is likely to become a problem in the smooth dogfish fishery because of the economics of the fishery. The State of Virginia notes that the smooth dogfish fishery subsists as a high volume and labor intensive endeavor, as a typical whole round weight of 1,000 pounds contains 200 to 250 individual dogfish. In a typical processed catch of smooth dogfish, the dockside value of the fins represents 20 to 30 percent of the price paid to fishermen for their total catch, and fishermen return dockside with meat and fins in separate containers. Delaying the removal of fins and tail until landing would result in decreased marketability. Smooth dogfish are harder than other species to extract from the net, butcher and clean, with the result that labor costs represent a higher percentage of the total value of the product. Cutting fins at sea is important practically to the fishery in order to maintain proper product freshness. In the absence of processing, there would be a loss of profitability to the industry because of the increased labor with re-handling each carcass.

Response: NMFS agrees that processing smooth dogfish is likely a labor intensive operation. While the delay in the removal of fins and tails until landing could reduce the quality and marketability of smooth dogfish, it is unclear whether any decreases in ex-vessel prices would exceed potential cost savings from reduced labor needs at sea associated with finning on the vessel. There would potentially be an increase in operating costs for dealers if they end up processing the fins from the smooth dogfish carcasses.

Comment 8: If NMFS set the smooth dogfish quota at 1,423,728 lb dw, we may not reach it very often but there would be years when we do. The pricing is dependent on the international market (years when the price is high, the quota will go fast).

Response: The proposed smooth dogfish quota was selected in order to accommodate average fishing levels. The 1,423,728 lb dw quota is equal to the maximum annual landings between 1998-2007 plus one standard deviation. NMFS acknowledges that in rare years, this quota might constrain the fishery. In part to address this issue, NMFS added an additional alternative to the FEIS where the smooth dogfish quota would be set equal to the maximum annual landings from 1998-2007 plus two standard deviations (1,577,319 lb dw). This new preferred alternative should accommodate the potential few years where the smooth dogfish quota may exceed 1,423,728 lb dw.

NMFS is also aware that international markets may impact the pricing of domestic smooth dogfish. However, NMFS does not currently have sufficient data on the fishery to model the degree to which high international prices may increase domestic landings of smooth dogfish.

Comment 9: There is little or no fin value for smooth dogfish.

Response: The median ex-vessel price for smooth dogfish fins was estimated to be \$2.02 per pound between 2004 and 2007. Based on ACCSP data from 1998-2007, in the commercial fishery an average of 1,321,695 lb ww of smooth dogfish were retained per year. Of this total, NMFS estimates 47,543 lb of fins would be available for sale per year. Using the median ex-vessel price of these products between 2004 and 2007 (\$2.02 for smooth dogfish fins), the fishery averaged \$ 96,037 in value per year.

**APPENDIX E TABLE OF CONTENTS**

**Appendix E Table of Contents.....E-i**

E.1 Letter to Thomas McIlwain, Chairman of the Gulf of Mexico Fishery  
Management Council Dated July 22, 2008.....E-1

E.2 Letter to Rick Leard, Acting Executive Director of the Gulf of Mexico Fishery  
Management Council Dated July 22, 2008.....E-5

E.3 Letter to Robert Shipp, Chairman of the Gulf of Mexico Fishery Management  
Council Dated October 14, 2009.....E-9

E.4 Letter to Thomas McIlwain, Chairman of the Gulf of Mexico Fishery  
Management Council Dated July 24, 2009.....E-11

E.5 Letter to Steve Bortone, Executive Director of the Gulf of Mexico Fishery  
Management Council Dated October 14, 200.....E-15

E.6 Letter to Rick Leard, Deputy Executive Director of the Gulf of Mexico Fishery  
Management Council Dated July 24, 2009.....E-17

E.7 Letter to George J. Geiger, Chairman of the South Atlantic Fishery Management  
Council Dated July 22, 2008.....E-21

E.8 Letter to Bob Mahood, Executive Director of the South Atlantic Fishery  
Management Council Dated July 22, 2008.....E-25

E.9 Letter to Charles Duane Harris, Chairman of the South Atlantic Fishery  
Management Council Dated September 4, 2009.....E-29

E.10 Letter to Charles Duane Harris, Chairman of the South Atlantic Fishery  
Management Council Dated July 24, 2009.....E-30

E.11 Letter to Bob Mahood, Executive Director of the South Atlantic Fishery  
Management Council Dated September 4, 2009.....E-33

E.12 Letter to Bob Mahood, Executive Director of the South Atlantic Fishery  
Management Council Dated July 24, 2009.....E-34





UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
Silver Spring, MD 20910

Thomas McIlwain, Chairman  
Gulf of Mexico Fishery Management Council  
2203 N. Lois Avenue  
Suite 1100  
Tampa, FL 33607

JUL 22 2009

Dear Mr. McIlwain:

The National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) has determined that blacknose sharks (*Carcharhinus acronotus*) are overfished, with overfishing occurring (Table 1, enclosed). This determination is based on the latest 2007 stock assessment of Small Coastal Sharks (SCS) in the U.S. Atlantic and Gulf of Mexico (November 13, 2007, 72 FR 6388). Overall, shrimp trawl bycatch in the Gulf of Mexico and South Atlantic combined accounted for 34-70 percent of all blacknose mortality from 2000-2005. Specifically, the 2007 stock assessment determined that from 2000-2005, 30-62 percent (average 44 percent per year) of blacknose mortality occurred as shrimp trawl bycatch in the Gulf of Mexico. Additionally, 4-7 percent of blacknose mortality occurred as shrimp trawl bycatch in the South Atlantic.

Under National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act, NMFS must take action to prevent overfishing. Therefore, the Highly Migratory Species Management Division is conducting rulemaking to amend the 2006 Consolidated Highly Migratory Species (HMS) Fishery Management Plan (FMP) to include new measures to rebuild and prevent overfishing of blacknose sharks. NMFS has scheduled four scoping meetings from Texas through Massachusetts (Table 2, enclosed) to obtain comments from the public on shark management measures. NMFS is also requesting time to present information to the five Atlantic Regional Fishery Management Councils and the two Marine Fisheries Commissions. These comments will be used to assist in the development of the upcoming amendment to the Consolidated HMS FMP.

As a result, I am requesting that the Gulf of Mexico Fishery Management Council, and the other Regional Fishery Management Councils that have fisheries that interact with blacknose sharks, provide a point of contact to the HMS Management Division in order to discuss and potentially develop collaborative management strategies to prevent overfishing of blacknose sharks.

Please feel free to contact Margo Schulze-Haugen if you have any questions at (301) 713-2347.

Sincerely,

*Emily Menachos*  
for Alan D. Risenhoover  
Director, Office of Sustainable Fisheries



Enclosures

cc: Wayne Swingle, Executive Director, GMFMC  
Roy Crabtree, Administrator, SERO  
Buck Sutter, Deputy Administrator, SERO  
Bonnie Ponwith, Director, SEFSC

Table 1. Summary Table of Biomass and Fishing Mortality for blacknose sharks based on Age-structured State-Space Age-Structured Production Models (SPASMs). Source: SEDAR 13 Stock Assessment Panel, July 9, 2007.

Species	Current Relative Biomass Level*	Current Biomass ( $N_{2005}$ )	Stock Abundance ( $N_{MSY}$ )	Minimum Stock Size Threshold (MSST)	Current Relative Fishing Mortality Rate ( $F_{2005}/F_{MSY}$ )	Maximum Fishing Mortality Threshold ( $F_{MSY}$ )	Outlook
Blacknose Sharks	0.48 ( $SSF_{2005}/SSF_{MSY}$ )	3.49E+05	5.7E+05	4.3E+05	3.77	0.07	Overfished; Overfishing is occurring

\*Spawning stock fecundity (SSF) was used as a proxy of biomass when biomass (B) does not influence pup production in sharks.

Table 2. Time and Locations of the four scoping meetings.

<b>Date</b>	<b>Time</b>	<b>Meeting Locations</b>	<b>Address</b>
7/30/08	5:30 – 7:30 p.m.	Freeport Branch Library	410 Brazosport Boulevard, Freeport, TX 77541
8/27/08	6:00 – 8:00 p.m.	NOAA Fisheries Service, Southeast Regional Office	263 13th Avenue South, Saint Petersburg, Florida 33701
8/28/08	5:30 – 7:30 p.m.	Fort Pierce Library	101 Melody Lane, Fort Pierce, FL 34950
10/9/08	3:00 – 5:00 p.m.	NOAA Fisheries Service, Northeast Regional Office	1 Blackburn Drive, Gloucester, MA 01930



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
Silver Spring, MD 20910

Rick Leard, Acting Executive Director  
Gulf of Mexico Fishery Management Council  
2203 N. Lois Avenue  
Suite 1100  
Tampa, FL 33607

JUL 22 2008

Dear Mr. Leard:

The National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) has determined that blacknose sharks (*Carcharhinus acronotus*) are overfished, with overfishing occurring (Table 1, enclosed). This determination is based on the latest 2007 stock assessment of Small Coastal Sharks (SCS) in the U.S. Atlantic and Gulf of Mexico (November 13, 2007, 72 FR 6388). Overall, shrimp trawl bycatch in the Gulf of Mexico and South Atlantic combined accounted for 34-70 percent of all blacknose mortality from 2000-2005. Specifically, the 2007 stock assessment determined that from 2000-2005, 30-62 percent (average 44 percent per year) of blacknose mortality occurred as shrimp trawl bycatch in the Gulf of Mexico. Additionally, 4-7 percent of blacknose mortality occurred as shrimp trawl bycatch in the South Atlantic.

Under National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act, NMFS must take action to prevent overfishing. Therefore, the Highly Migratory Species Management Division is conducting rulemaking to amend the 2006 Consolidated Highly Migratory Species (HMS) Fishery Management Plan (FMP) to include new measures to rebuild and prevent overfishing of blacknose sharks. NMFS has scheduled four scoping meetings from Texas through Massachusetts (Table 2, enclosed) to obtain comments from the public on shark management measures. NMFS is also requesting time to present information to the five Atlantic Regional Fishery Management Councils and the two Marine Fisheries Commissions. These comments will be used to assist in the development of the upcoming amendment to the Consolidated HMS FMP.

As a result, I am requesting that the Gulf of Mexico Fishery Management Council, and the other Regional Fishery Management Councils that have fisheries that interact with blacknose sharks, provide a point of contact to the HMS Management Division in order to discuss and potentially develop collaborative management strategies to prevent overfishing of blacknose sharks.

Please feel free to contact Margo Schulze-Haugen if you have any questions at (301) 713-2347.

Sincerely,

  
for Alan D. Wisenhoover  
Director, Office of Sustainable Fisheries



Enclosures

cc: Roy Crabtree, Administrator, SERO  
Buck Sutter, Deputy Administrator, SERO  
Bonnie Ponwith, Director, SEFSC

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UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
Silver Spring, MD 20910

Robert Shipp, Ph.D., Chairman  
Gulf of Mexico Fishery Management Council  
2203 N. Lois Avenue  
Suite 1100  
Tampa, FL 33607

OCT 14 2009

Dear Dr. Shipp

On July 24, 2009, the National Marine Fisheries Service (NMFS) published the proposed rule for Amendment 3 to the Consolidated Highly Migratory Species (HMS) Fishery Management Plan (FMP) (74 FR 36892) and released the Draft Environmental Impact Statement. As you know, Draft Amendment 3 proposes management measures to rebuild overfished blacknose sharks, to end overfishing of blacknose sharks and shortfin mako sharks, and to establish management of smooth dogfish. With publication of the proposed rule, it was our intent to send you the attached letter that requests the cooperation of the Gulf of Mexico Fishery Management Council (GOMFMC) in finding ways to reduce blacknose shark bycatch mortality in the shrimp trawl fishery by 78 percent from the average mortality levels from 1999-2005. However, due to an administrative oversight, the letter was not sent, and the original letter dated July 24, 2009, is included with this letter.

In a letter dated August 21, 2009, the GOMFMC states that shrimp trawl effort has been reduced by approximately 84 percent since 2001-2003, and requests clarification of the data used to evaluate blacknose shark take in the shrimp fishery in the Gulf of Mexico (GOM) and the SEAMAP data. In addition, NMFS received a letter from Mr. Randy Pausina and Mr. Myron Fischer of the Louisiana Department of Wildlife and Fisheries, dated August 28, 2009, which states that Dr. James Nance of NMFS has indicated a reduction in shrimp effort since 2005 in the 75 to 80 percent range.

Effort in the GOM shrimp fishery has decreased 64 percent from the average effort across the entire GOM in 1999-2005 compared to effort in 2008 (James Nance, pers. comm.). Although an analysis of the spatial/temporal distribution of this reduction relative to the distribution of blacknose shark bycatch has not been conducted, a starting assumption could be that this equates to a commensurate 64 percent reduction in bycatch.

Modeling efforts are ongoing that incorporate a Turtle Excluder Device (TED) effect in the bycatch estimation model. Preliminary analyses utilizing the new modeling technique indicate that bycatch may have been reduced by approximately 50 percent in 1999-2005. When bycatch reductions from the effort reduction of 64 percent is combined with an approximately 50 percent bycatch reduction anticipated from the TED effect, a preliminary estimate of the overall reduction is approximately 82 percent from 1999-2005 levels. Full results will be provided once the study is complete. The uncertainty is not fully defined in these preliminary bycatch



estimates, and there may be spatio-temporal differences in bycatch trends. More data and further analyses are required to determine any uncertainty in our estimates and to re-evaluate the status of the blacknose shark stock. The next assessment is scheduled for 2010, and we will re-visit shrimp bycatch and shrimping effort at that time.

Full descriptions of the data used in the 2007 blacknose stock assessment to estimate blacknose bycatch in the GOM are in SEDAR13-DW-31 and SEDAR13-DW-32. Both papers are available on the SEDAR website at

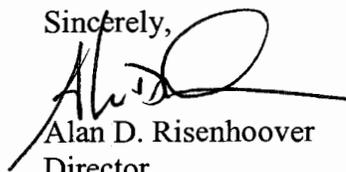
[http://www.sefsc.noaa.gov/sedar/Sedar\\_Documents.jsp?WorkshopNum=13&FolderType=Data](http://www.sefsc.noaa.gov/sedar/Sedar_Documents.jsp?WorkshopNum=13&FolderType=Data).

As outlined in the Final SEDAR 13 SCS Report, the bycatch in the south Atlantic was calculated as a proportion of the Gulf of Mexico bycatch. As for the data from the Southeast Area Monitoring and Assessment Program (SEAMAP) six "time series" were used to estimate blacknose shark bycatch in the shrimp trawl fisheries. These were the fall time series Fall Groundfish (FG) 1972-1986, First Fall (FF) 1987, Fall SEAMAP (FS) 1988-2006; and the summer time series Summer SEAMAP (SS) 1987-2006, Early SEAMAP (ES) 1982-1986, and Texas Closure (TC) 1981. The SEAMAP surveys did not utilize TEDs. However, shrimp trawl observer data from 1972-2005 also were used to estimate blacknose bycatch in the shrimp trawl fisheries and shrimp trawl effort data for the Gulf of Mexico and the South Atlantic from 1972 – 2005 were also used in the SEDAR 13 assessment. If necessary, the Southeast Fisheries Science Center can provide additional clarification of the blacknose shark assessment data.

If the GOMFMC determines that the 78 percent reduction in blacknose shark bycatch mortality has been met by the reduction in shrimp trawl effort and the bycatch reduction effects of TEDs and BRDs, please respond to that affect at your earliest convenience. If the GOMFMC does not make this determination and you would like to discuss the matter further, please do not hesitate to contact me. Also, please note that the mortality reductions needed in the Gulf of Mexico shrimp fisheries are in addition to reductions needed in the HMS fisheries and do not affect NMFS' obligation to reduce blacknose shark mortality across all other fisheries by 78 percent. Therefore, NMFS must still pursue measures in the final Amendment 3 to the Consolidated HMS FMP.

I apologize for the delay in getting the original letter to you and appreciate your consideration of and work on the issue. Please feel free to contact Karyl Brewster-Geisz if you have any questions at (301) 713-2347.

Sincerely,



Alan D. Risenhoover  
Director,  
Office of Sustainable Fisheries

Enclosure

cc: Bonnie Ponwith  
Roy Crabtree



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL MARINE FISHERIES SERVICE  
1315 East-West Highway  
Silver Spring, Maryland 20910  
THE DIRECTOR

JUL 24 2009

Thomas McIlwain, Chairman  
Gulf of Mexico Fishery Management Council  
Gulf Coast Research Lab  
703 East Beach Drive  
Ocean Springs, MS 39564

Dear Dr. McIlwain:

As noted in our letter dated, July 22, 2008 to the Gulf of Mexico Fishery Management Council (GOMFMC), the National Marine Fisheries Service (NMFS) has determined that blacknose sharks (*Carcharhinus acronotus*) are overfished, with overfishing occurring (Table 1, enclosed). This determination is based on the latest 2007 stock assessment of Small Coastal Sharks (SCS) in the U.S. Atlantic and Gulf of Mexico (November 13, 2007, 72 FR 6388). Under National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act, NMFS must take action to prevent overfishing. The stock assessment stated that to rebuild the species within the required timeframe, the total allowable catch (TAC) of blacknose sharks across all fisheries must be 19,200 fish per year. This TAC is equivalent to a 78% reduction in mortality across all fisheries that catch blacknose sharks. Currently, NMFS is amending the 2006 Consolidated Atlantic Highly Migratory Species (HMS) Fishery Management Plan (FMP) via Amendment 3 to reduce directed shark effort in the Atlantic shark fisheries by 78 percent (Attached).

The stock assessment showed that the incidental catch of blacknose sharks within shrimp trawl fisheries is one of the most significant sources of mortality for blacknose sharks. Overall, shrimp trawl bycatch of blacknose sharks in the Gulf of Mexico and South Atlantic combined accounted for 34 to 70 percent of all blacknose mortality from 1999-2005. Specifically, the 2007 stock assessment determined that from 1999-2005, 30 to 62 percent (average 45 percent per year) of blacknose mortality occurred as shrimp trawl bycatch in the Gulf of Mexico. Additionally, 4 to 7 percent of blacknose mortality occurred as shrimp trawl bycatch in the South Atlantic.

However, NMFS recognizes that current offshore shrimp trawl effort in 2006 and 2007 is down by 50 percent compared to the average annual offshore shrimp trawl effort from 1999 – 2005 (from an average of 173,487 24-hour days fished in 1999-2005 to an average of 86,680 24-hour days fished in 2006-2007). In addition, recent changes in bycatch reduction devices (BRDs), such as the Modified Jones Davis, may help release more small sharks, in general, from shrimp trawls. NMFS believes these recent reductions in shrimp trawl effort and recent changes in BRDs may help achieve a portion of the needed reduction in mortality. The SEFSC has been working with industry scientists to re-evaluate the shrimp bycatch models used in the 2007 SCS stock assessments. In particular, they have been evaluating the effect of turtle exclusion devices, or TEDs, on SCS bycatch in shrimp trawls. Once the SEFSC has finished their evaluation of those models, NMFS could revise blacknose shark bycatch estimates. Preliminary results

THE ASSISTANT ADMINISTRATOR  
FOR FISHERIES



suggest that the post-TED (*i.e.*, from 1990 on) reduction in bycatch from the model currently in development is approximately 50 percent. The SEFSC has also run sensitivity analyses to determine the effect of reduced blacknose bycatch in shrimp trawls on the stock status of blacknose sharks. Although stock status improves, despite reductions in shrimp trawl bycatch of 25, 50, and 75 percent, the stock continues to be overfished ( $N_{2005}/N_{MSY} = 0.66$  to  $0.74$  versus  $0.48$  in the baseline assessment run from the 2007 blacknose shark stock assessment) with overfishing occurring ( $F_{2005}/F_{MSY} = 2.67$  to  $2.21$  versus  $3.77$  in the baseline assessment run from the 2007 blacknose shark stock assessment).

After consulting with the HMS Advisory Panel, NMFS has determined that the most effective method to prevent overfishing and rebuild blacknose sharks is to reduce mortality equally across all fisheries that interact with blacknose sharks, including the directed shark fishery and incidental catch in other fisheries, such as the shrimp trawl fishery. As such, NMFS is requesting the cooperation of the Gulf of Mexico Fishery Management Council in finding ways to reduce blacknose bycatch mortality in the shrimp trawl fishery by 78 percent from the 1999-2005 average catch. According to the stock assessment, an average of 38,626 blacknose sharks per year are killed in the Gulf of Mexico shrimp trawl fishery. This level of mortality needs to be reduced by 78 percent or to 8,498 blacknose sharks per year (Table 2). NMFS is also requesting the South Atlantic Fishery Management Council (SAFMC) to take similar actions to reduce blacknose bycatch mortality in the shrimp trawl fishery.

Thank you for your consideration of this issue, and please feel free to contact Margo Schulze-Haugen if you have any questions at (301) 713-2347.

Sincerely,



James W. Balsiger, Ph.D.

Acting Assistant Administrator for Fisheries

Enclosures

cc: Roy Crabtree, SERO  
Bonnie Ponwith, SEFSC

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\*Spawning stock fecundity (SSF) was used as a proxy of biomass when biomass (B) does not influence pup production in sharks.

Table 2. Sources of blacknose shark mortality, 1999-2005 (SEDAR 13 Stock Assessment Panel, July 9, 2007). Estimates from the 'longline', 'nets', and 'lines' columns are derived from data reported in the Northeast and Southeast General Canvass data systems. Longline discards are derived from multiplying the longline landings by the ratio of dead discards observed in the commercial shark bottom longline fishery. The numbers in the shrimp bycatch columns are derived using a Bayesian model (Nichols, 2007).

Commercial (number of fish)						Recreational (number of fish)
Longline	Nets	Lines	BLL Discards	GOM Shrimp bycatch	SA Shrimp bycatch	Landings
8,091	19,041	352	5,007	38,626	4,856	10,408
9%	22%	0%	6%	45%	6%	12%





**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL MARINE FISHERIES SERVICE  
Silver Spring, MD 20910

Steve Bortone, Executive Director  
Gulf of Mexico Fishery Management Council  
2203 N. Lois Avenue  
Suite 1100  
Tampa, FL 33607

OCT 14 2009

Dear Dr. Bortone,

On July 24, 2009, the National Marine Fisheries Service (NMFS) published the proposed rule for Amendment 3 to the Consolidated Highly Migratory Species (HMS) Fishery Management Plan (FMP) (74 FR 36892) and released the Draft Environmental Impact Statement. As you know, Draft Amendment 3 proposes management measures to rebuild overfished blacknose sharks, to end overfishing of blacknose sharks and shortfin mako sharks, and to establish management of smooth dogfish. With publication of the proposed rule, it was our intent to send you the attached letter that requests the cooperation of the Gulf of Mexico Fishery Management Council (GOMFMC) in finding ways to reduce blacknose shark bycatch mortality in the shrimp trawl fishery by 78 percent from the average mortality levels from 1999-2005. However, due to an administrative oversight, the letter was not sent, and the original letter dated July 24, 2009, is included with this letter.

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Effort in the GOM shrimp fishery has decreased 64 percent from the average effort across the entire GOM in 1999-2005 compared to effort in 2008 (James Nance, pers. comm.). Although an analysis of the spatial/temporal distribution of this reduction relative to the distribution of blacknose shark bycatch has not been conducted, a starting assumption could be that this equates to a commensurate 64 percent reduction in bycatch.

Modeling efforts are ongoing that incorporate a Turtle Excluder Device (TED) effect in the bycatch estimation model. Preliminary analyses utilizing the new modeling technique indicate that bycatch may have been reduced by approximately 50 percent in 1999-2005. When bycatch reductions from the effort reduction of 64 percent is combined with an approximately 50 percent bycatch reduction anticipated from the TED effect, a preliminary estimate of the overall reduction is approximately 82 percent from 1999-2005 levels. Full results will be provided once



the study is complete. The uncertainty is not fully defined in these preliminary bycatch estimates, and there may be spatio-temporal differences in bycatch trends. More data and further analyses are required to determine any uncertainty in our estimates and to re-evaluate the status of the blacknose shark stock. The next assessment is scheduled for 2010, and we will re-visit shrimp bycatch and shrimping effort at that time.

Full descriptions of the data used in the 2007 blacknose stock assessment to estimate blacknose bycatch in the GOM are in SEDAR13-DW-31 and SEDAR13-DW-32. Both papers are available on the SEDAR website at

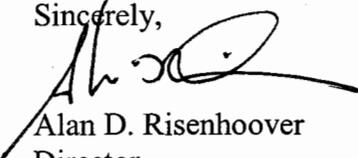
[http://www.sefsc.noaa.gov/sedar/Sedar\\_Documents.jsp?WorkshopNum=13&FolderType=Data](http://www.sefsc.noaa.gov/sedar/Sedar_Documents.jsp?WorkshopNum=13&FolderType=Data).

As outlined in the Final SEDAR 13 SCS Report, the bycatch in the south Atlantic was calculated as a proportion of the Gulf of Mexico bycatch. As for the data from the Southeast Area Monitoring and Assessment Program (SEAMAP) six "time series" were used to estimate blacknose shark bycatch in the shrimp trawl fisheries. These were the fall time series Fall Groundfish (FG) 1972-1986, First Fall (FF) 1987, Fall SEAMAP (FS) 1988-2006; and the summer time series Summer SEAMAP (SS) 1987-2006, Early SEAMAP (ES) 1982-1986, and Texas Closure (TC) 1981. The SEAMAP surveys did not utilize TEDs. However, shrimp trawl observer data from 1972-2005 also were used to estimate blacknose bycatch in the shrimp trawl fisheries and shrimp trawl effort data for the Gulf of Mexico and the South Atlantic from 1972 – 2005 were also used in the SEDAR 13 assessment. If necessary, the Southeast Fisheries Science Center can provide additional clarification of the blacknose shark assessment data.

If the GOMFMC determines that the 78 percent reduction in blacknose shark bycatch mortality has been met by the reduction in shrimp trawl effort and the bycatch reduction effects of TEDs and BRDs, please respond to that affect at your earliest convenience. If the GOMFMC does not make this determination and you would like to discuss the matter further, please do not hesitate to contact me. Also, please note that the mortality reductions needed in the Gulf of Mexico shrimp fisheries are in addition to reductions needed in the HMS fisheries and do not affect NMFS' obligation to reduce blacknose shark mortality across all other fisheries by 78 percent. Therefore, NMFS must still pursue measures in the final Amendment 3 to the Consolidated HMS FMP.

I apologize for the delay in getting the original letter to you and appreciate your consideration of and work on the issue. Please feel free to contact Karyl Brewster-Geisz if you have any questions at (301) 713-2347.

Sincerely,



Alan D. Risenhoover  
Director,  
Office of Sustainable Fisheries

Enclosure  
cc: Bonnie Ponwith  
Roy Crabtree  
Rick Leard



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL MARINE FISHERIES SERVICE  
1315 East-West Highway  
Silver Spring, Maryland 20910  
THE DIRECTOR

Rick Leard, Deputy Executive Director  
Gulf of Mexico Fishery Management Council  
2203 N. Lois Avenue  
Suite 1100  
Tampa, FL 33607

JUL 24 2009

Dear Dr. Leard:

As noted in our letter dated, July 22, 2008 to the Gulf of Mexico Fishery Management Council (GOMFMC), the National Marine Fisheries Service (NMFS) has determined that blacknose sharks (*Carcharhinus acronotus*) are overfished, with overfishing occurring (Table 1, enclosed). This determination is based on the latest 2007 stock assessment of Small Coastal Sharks (SCS) in the U.S. Atlantic and Gulf of Mexico (November 13, 2007, 72 FR 6388). Under National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act, NMFS must take action to prevent overfishing. The stock assessment stated that to rebuild the species within the required timeframe, the total allowable catch (TAC) of blacknose sharks across all fisheries must be 19,200 fish per year. This TAC is equivalent to a 78% reduction in mortality across all fisheries that catch blacknose sharks. Currently, NMFS is amending the 2006 Consolidated Atlantic Highly Migratory Species (HMS) Fishery Management Plan (FMP) via Amendment 3 to reduce directed shark effort in the Atlantic shark fisheries by 78 percent (Attached).

The stock assessment showed that the incidental catch of blacknose sharks within shrimp trawl fisheries is one of the most significant sources of mortality for blacknose sharks. Overall, shrimp trawl bycatch of blacknose sharks in the Gulf of Mexico and South Atlantic combined accounted for 34 to 70 percent of all blacknose mortality from 1999-2005. Specifically, the 2007 stock assessment determined that from 1999-2005, 30 to 62 percent (average 45 percent per year) of blacknose mortality occurred as shrimp trawl bycatch in the Gulf of Mexico. Additionally, 4 to 7 percent of blacknose mortality occurred as shrimp trawl bycatch in the South Atlantic.

However, NMFS recognizes that current offshore shrimp trawl effort in 2006 and 2007 is down by 50 percent compared to the average annual offshore shrimp trawl effort from 1999 – 2005 (from an average of 173,487 24-hour days fished in 1999-2005 to an average of 86,680 24-hour days fished in 2006-2007). In addition, recent changes in bycatch reduction devices (BRDs), such as the Modified Jones Davis, may help release more small sharks, in general, from shrimp trawls. NMFS believes these recent reductions in shrimp trawl effort and recent changes in BRDs may help achieve a portion of the needed reduction in mortality. The SEFSC has been working with industry scientists to re-evaluate the shrimp bycatch models used in the 2007 SCS stock assessments. In particular, they have been evaluating the effect of turtle exclusion devices, or TEDs, on SCS bycatch in shrimp trawls. Once the SEFSC has finished their evaluation of those models, NMFS could revise blacknose shark bycatch estimates. Preliminary results

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FOR FISHERIES

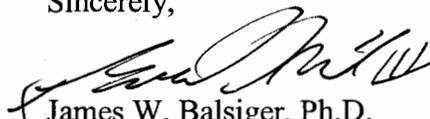


suggest that the post-TED (*i.e.*, from 1990 on) reduction in bycatch from the model currently in development is approximately 50 percent. The SEFSC has also run sensitivity analyses to determine the effect of reduced blacknose bycatch in shrimp trawls on the stock status of blacknose sharks. Although stock status improves, despite reductions in shrimp trawl bycatch of 25, 50, and 75 percent, the stock continues to be overfished ( $N_{2005}/N_{MSY} = 0.66$  to  $0.74$  versus  $0.48$  in the baseline assessment run from the 2007 blacknose shark stock assessment) with overfishing occurring ( $F_{2005}/F_{MSY} = 2.67$  to  $2.21$  versus  $3.77$  in the baseline assessment run from the 2007 blacknose shark stock assessment).

After consulting with the HMS Advisory Panel, NMFS has determined that the most effective method to prevent overfishing and rebuild blacknose sharks is to reduce mortality equally across all fisheries that interact with blacknose sharks, including the directed shark fishery and incidental catch in other fisheries, such as the shrimp trawl fishery. As such, NMFS is requesting the cooperation of the Gulf of Mexico Fishery Management Council in finding ways to reduce blacknose bycatch mortality in the shrimp trawl fishery by 78 percent from the 1999-2005 average catch. According to the stock assessment, an average of 38,626 blacknose sharks per year are killed in the Gulf of Mexico shrimp trawl fishery. This level of mortality needs to be reduced by 78 percent or to 8,498 blacknose sharks per year (Table 2). NMFS is also requesting the South Atlantic Fishery Management Council (SAFMC) to take similar actions to reduce blacknose bycatch mortality in the shrimp trawl fishery.

Thank you for your consideration of this issue, and please feel free to contact Margo Schulze-Haugen if you have any questions at (301) 713-2347.

Sincerely,



James W. Balsiger, Ph.D.

Acting Assistant Administrator for Fisheries

Enclosures

cc: Roy Crabtree, SERO  
Bonnie Ponwith, SEFSC

Table 1. Summary Table of Biomass and Fishing Mortality for blacknose sharks based on Age-structured State-Space Age-Structured Production Models (SPASMs). Source: SEDAR 13 Stock Assessment Panel, July 9, 2007.

Species	Current Relative Biomass Level*	Current Biomass ( $N_{2005}$ )	Stock Abundance ( $N_{MSY}$ )	Minimum Stock Size Threshold (MSST)	Current Relative Fishing Mortality Rate ( $F_{2005}/F_{MSY}$ )	Maximum Fishing Mortality Threshold ( $F_{MSY}$ )	Outlook
Blacknose Sharks	0.48 ( $SSF_{2005}/SSF_{MSY}$ )	3.49E+05	5.7E+05	4.3E+05	3.77	0.07	Overfished; Overfishing is occurring

\*Spawning stock fecundity (SSF) was used as a proxy of biomass when biomass (B) does not influence pup production in sharks.

Table 2. Sources of blacknose shark mortality, 1999-2005 (SEDAR 13 Stock Assessment Panel, July 9, 2007). Estimates from the 'longline', 'nets', and 'lines' columns are derived from data reported in the Northeast and Southeast General Canvass data systems. Longline discards are derived from multiplying the longline landings by the ratio of dead discards observed in the commercial shark bottom longline fishery. The numbers in the shrimp bycatch columns are derived using a Bayesian model (Nichols, 2007).

Commercial (number of fish)						Recreational (number of fish)
Longline	Nets	Lines	BLL Discards	GOM Shrimp bycatch	SA Shrimp bycatch	Landings
8,091	19,041	352	5,007	38,626	4,856	10,408
9%	22%	0%	6%	45%	6%	12%





UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
Silver Spring, MD 20910

George J. Geiger, Chairman  
South Atlantic Fishery Management Council  
4055 Faber Place Drive  
Suite 201  
North Charleston, SC 29405

JUL 22 2009

Dear Mr. Geiger:

The National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) has determined that blacknose sharks (*Carcharhinus acronotus*) are overfished, with overfishing occurring (Table 1, enclosed). This determination is based on the latest 2007 stock assessment of Small Coastal Sharks (SCS) in the U.S. Atlantic and Gulf of Mexico (November 13, 2007, 72 FR 6388). Overall, shrimp trawl bycatch in the Gulf of Mexico and South Atlantic combined accounted for 34-70 percent of all blacknose mortality from 2000-2005. Specifically, the 2007 stock assessment determined that from 2000-2005, 30-62 percent (average 44 percent per year) of blacknose mortality occurred as shrimp trawl bycatch in the Gulf of Mexico. Additionally, 4-7 percent of blacknose mortality occurred as shrimp trawl bycatch in the South Atlantic.

Under National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act, NMFS must take action to prevent overfishing. Therefore, the Highly Migratory Species Management Division is conducting rulemaking to amend the 2006 Consolidated Highly Migratory Species (HMS) Fishery Management Plan (FMP) to include new measures to rebuild and prevent overfishing of blacknose sharks. NMFS has scheduled four scoping meetings from Texas through Massachusetts (Table 2, enclosed) to obtain comments from the public on shark management measures. NMFS is also requesting time to present information to the five Atlantic Regional Fishery Management Councils and the two Marine Fisheries Commissions. These comments will be used to assist in the development of the upcoming amendment to the Consolidated HMS FMP.

As a result, I am requesting that the South Atlantic Fishery Management Council, and the other Regional Fishery Management Councils that have fisheries that interact with blacknose sharks, provide a point of contact to the HMS Management Division in order to discuss and potentially develop collaborative management strategies to prevent overfishing of blacknose sharks.

Please feel free to contact Margo Schulze-Haugen if you have any questions at (301) 713-2347.

Sincerely,

*Emily Menachies*  
for Alan D. Risenhoover  
Director, Office of Sustainable Fisheries



Enclosures

cc: Wayne Swingle, Executive Director, GMFMC  
Roy Crabtree, Administrator, SERO  
Buck Sutter, Deputy Administrator, SERO  
Bonnie Ponwith, Director, SEFSC

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Table 2. Time and Locations of the four scoping meetings.

<b>Date</b>	<b>Time</b>	<b>Meeting Locations</b>	<b>Address</b>
7/30/08	5:30 – 7:30 p.m.	Freeport Branch Library	410 Brazosport Boulevard, Freeport, TX 77541
8/27/08	6:00 – 8:00 p.m.	NOAA Fisheries Service, Southeast Regional Office	263 13th Avenue South, Saint Petersburg, Florida 33701
8/28/08	5:30 – 7:30 p.m.	Fort Pierce Library	101 Melody Lane, Fort Pierce, FL 34950
10/9/08	3:00 – 5:00 p.m.	NOAA Fisheries Service, Northeast Regional Office	1 Blackburn Drive, Gloucester, MA 01930



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
Silver Spring, MD 20910

Bob Mahood, Executive Director  
South Atlantic Fishery Management Council  
4055 Faber Place Drive  
Suite 201  
North Charleston, SC 29405

JUL 22 2008

Dear Mr. Mahood:

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Please feel free to contact Margo Schulze-Haugen if you have any questions at (301) 713-2347.

Sincerely,

  
Alan D. Risenhoover  
Director, Office of Sustainable Fisheries



Enclosures

cc: Wayne Swingle, Executive Director, GMFMC  
Roy Crabtree, Administrator, SERO  
Buck Sutter, Deputy Administrator, SERO  
Bonnie Ponwith, Director, SEFSC

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**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL MARINE FISHERIES SERVICE  
Silver Spring, MD 20910

Charles Duane Harris, Chairman  
South Atlantic Fishery Management Council  
105 Demere Retreat Lane  
St. Simons Island, GA 31522

SEP 04 2009

Dear Mr. Harris:

On July 24, 2009, the National Marine Fisheries Service (NMFS) published the proposed rule for Amendment 3 to the Consolidated Highly Migratory Species (HMS) Fishery Management Plan (FMP) (74 FR 36892) and released the Draft Environmental Impact Statement. Draft Amendment 3 proposes management measures to rebuild overfished blacknose sharks, to end overfishing of blacknose sharks and shortfin mako sharks, and to establish management of smooth dogfish. With the publishing of the proposed rule, it was our intent to send you the attached letter that requests the cooperation of the South Atlantic Fishery Management Council in finding ways to reduce blacknose shark bycatch mortality in the shrimp trawl fishery by 78 percent from the average mortality levels from 1999-2005. However, due to an oversight, the letter was not sent and therefore I have included the original letter dated July 24, 2009, with this letter. The HMS Management Division will be briefing the South Atlantic Fishery Management Council on Amendment 3 on September 17, 2009 from 4:30 – 5:30 pm and we look forward to discussing the issues with you then.

I apologize for the delay in getting the original letter to you and appreciate your consideration of the issue. Please feel free to contact Margo Schulze-Haugen if you have any questions at (301) 713-2347.

Sincerely,

Alan D. Risenhoover  
Director, Office of Sustainable Fisheries

Enclosures





**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL MARINE FISHERIES SERVICE  
1315 East-West Highway  
Silver Spring, Maryland 20910  
THE DIRECTOR

Charles Duane Harris, Chairman  
South Atlantic Fishery Management Council  
105 Demere Retreat Lane  
St. Simons Island, GA 31522

JUL 24 2009

Dear Mr. Harris:

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The stock assessment showed that the incidental catch of blacknose sharks within shrimp trawl fisheries is one of the most significant sources of mortality for blacknose sharks. Overall, shrimp trawl bycatch of blacknose sharks in the Gulf of Mexico and South Atlantic combined accounted for 34 to 70 percent of all blacknose mortality from 1999-2005. Specifically, the 2007 stock assessment determined that from 1999-2005, 30 to 62 percent (average 45 percent per year) of blacknose mortality occurred as shrimp trawl bycatch in the Gulf of Mexico. Additionally, 4 to 7 percent of blacknose mortality occurred as shrimp trawl bycatch in the South Atlantic.

Recent changes in bycatch reduction devices (BRDs), such as the Modified Jones Davis, may help release more small sharks, in general, from shrimp trawls. NMFS believes these devices in addition to recent reductions in shrimp trawl effort may help achieve a portion of the needed reduction in mortality. The SEFSC has been working with industry scientists to re-evaluate the shrimp bycatch models used in the 2007 SCS stock assessments. In particular, they have been evaluating the effect of turtle exclusion devices, or TEDs, on SCS bycatch in shrimp trawls. Once the SEFSC has finished their evaluation of those models, NMFS could revise blacknose shark bycatch estimates. Preliminary results suggest that the post-TED (*i.e.*, from 1990 on) reduction in bycatch from the model currently in development is approximately 50 percent. The SEFSC has also run sensitivity analyses to determine the effect of reduced blacknose bycatch in shrimp trawls on the stock status of blacknose sharks. Although stock status improves, despite reductions in shrimp trawl bycatch of 25, 50, and 75 percent, the stock continues to be overfished

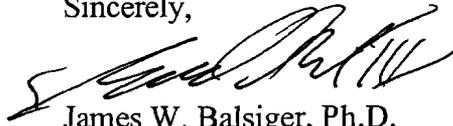


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After consulting with the Highly Migratory Species (HMS) Advisory Panel, NMFS has determined that the most effective method to prevent overfishing and rebuild blacknose sharks is to reduce mortality equally across all fisheries that interact with blacknose sharks, including the directed shark fishery and incidental catches in other fisheries, such as the shrimp trawl fishery. As such, NMFS is requesting the cooperation of the South Atlantic Fishery Management Council in finding ways to reduce blacknose mortality bycatch in the shrimp trawl fishery by 78 percent from the 1999-2005 average mortality. According to the stock assessment, an average of 4,856 blacknose sharks per year are killed in the South Atlantic shrimp trawl fishery; this level of mortality needs to be reduced by 78 percent or to 1,069 blacknose sharks per year (Table 2). NMFS is also requesting the Gulf of Mexico Fishery Management Council (GOMFMC) to take similar actions.

Thank you for your consideration of this issue, and please feel free to contact Margo Schulze-Haugen if you have any questions at (301) 713-2347.

Sincerely,



James W. Balsiger, Ph.D.

Acting Assistant Administrator for Fisheries

Enclosures

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**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL MARINE FISHERIES SERVICE  
Silver Spring, MD 20910

SEP 04 2009

Bob Mahood, Executive Director  
South Atlantic Fishery Management Council  
4055 Faber Place Drive  
Suite 201  
North Charleston, SC 29405

Dear Mr. Mahood:

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Sincerely,

Alan D. Risenhoover  
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Enclosures





**UNITED STATES DEPARTMENT OF COMMERCE**  
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NATIONAL MARINE FISHERIES SERVICE  
1315 East-West Highway  
Silver Spring, Maryland 20910  
THE DIRECTOR

JUL 24 2009

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South Atlantic Fishery Management Council  
4055 Faber Place Drive  
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FOR FISHERIES

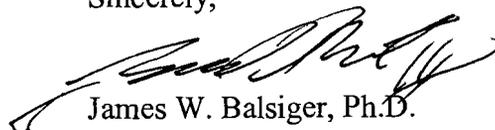


reductions in shrimp trawl bycatch of 25, 50, and 75 percent, the stock continues to be overfished ( $N_{2005}/N_{MSY} = 0.66$  to  $0.74$  versus  $0.48$  in the baseline assessment run from the 2007 blacknose shark stock assessment) with overfishing occurring ( $F_{2005}/F_{MSY} = 2.67$  to  $2.21$  versus  $3.77$  in the baseline assessment run from the 2007 blacknose shark stock assessment).

After consulting with the HMS Advisory Panel, NMFS has determined that the most effective method to prevent overfishing and rebuild blacknose sharks is to reduce mortality equally across all fisheries that interact with blacknose sharks, including the directed shark fishery and incidental catches in other fisheries, such as the shrimp trawl fishery. As such, NMFS is requesting the cooperation of the South Atlantic Fishery Management Council in finding ways to reduce blacknose mortality bycatch in the shrimp trawl fishery by 78 percent from the 1999-2005 average mortality. According to the stock assessment, an average of 4,856 blacknose sharks per year are killed in the South Atlantic shrimp trawl fishery; this level of mortality needs to be reduced by 78 percent or to 1,069 blacknose sharks per year (Table 2). NMFS is also requesting the Gulf of Mexico Fishery Management Council (GOMFMC) to take similar actions.

Thank you for your consideration of this issue, and please feel free to contact Margo Schulze-Haugen if you have any questions at (301) 713-2347.

Sincerely,



James W. Balsiger, Ph.D.  
Acting Assistant Administrator for Fisheries

Enclosures

Table 1. Summary Table of Biomass and Fishing Mortality for blacknose sharks based on Age-structured State-Space Age-Structured Production Models (SPASMs). Source: SEDAR 13 Stock Assessment Panel, July 9, 2007.

Species	Current Relative Biomass Level*	Current Biomass ( $N_{2005}$ )	Stock Abundance ( $N_{MSY}$ )	Minimum Stock Size Threshold (MSST)	Current Relative Fishing Mortality Rate ( $F_{2005}/F_{MSY}$ )	Maximum Fishing Mortality Threshold ( $F_{MSY}$ )	Outlook
Blacknose Sharks	0.48 ( $SSF_{2005}/SSF_{MSY}$ )	3.49E+05	5.7E+05	4.3E+05	3.77	0.07	Overfished; Overfishing is occurring

\*Spawning stock fecundity (SSF) was used as a proxy of biomass when biomass (B) does not influence pup production in sharks.

Table 2. Sources of blacknose shark mortality, 1999-2005 (SEDAR 13 Stock Assessment Panel, July 9, 2007). Estimates from the 'longline', 'nets', and 'lines' columns are derived from data reported in the Northeast and Southeast General Canvass' data systems. Longline discards are derived from multiplying the longline landings by the ratio of dead discards observed in the commercial shark bottom longline fishery. The numbers in the shrimp bycatch columns are derived using a Bayesian model (Nichols, 2007).

Commercial (number of fish)						Recreational (number of fish)
Longline	Nets	Lines	BLL Discards	GOM Shrimp bycatch	SA Shrimp bycatch	Landings
8,091	19,041	352	5,007	38,626	4,856	10,408
9%	22%	0%	6%	45%	6%	12%